



Amateur Radio

OCTOBER, 1960

VOL. 23

No. 10

AEGIS

NEW PRODUCTS

Latest releases in
**HI-FI STEREO
EQUIPMENT**

available from your local
Aegis dealer or from . . .

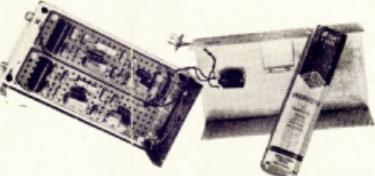
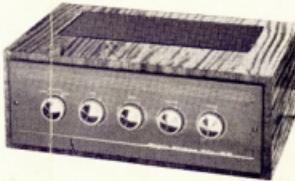
MAGRATHS of MELB.

"The Mecca of Hi-Fi"

(Top right) Aegis **STEREO SIX-88 AMPLIFIER**. This ultra-linear integrated amplifier has a choice of three inputs—stereo, monaural, radio tuner. Full 16 watts of power—two independent 8-watt amplifiers in one chassis. Six double-valves plus two silicon diodes. **Retail price, £39/15/6.** Fully ventilated bookshelf cabinet, an optional extra at £6.10.0.

(Centre right) Aegis **NEW IMPROVED Mark 2 TUNER in BOOKSHELF CABINET**. Power supply from existing amplifier through voltage-dropping adaptor supplied. Alternatively, an outboard power supply available (Aegis Type PS 2) and can be fitted directly to tuner. **Retail price, £16/11/6.**

(Bottom right) Aegis **TRANSISTORISED STEREO PRE-AMP**. Ideal for operating low-gain magnetic pick-up with hi-fi amplifier such as Aegis Six-88 or Mullard 5/10. Power supply: 9 volts DC, battery 2304. 4 x OC71 transistors. Weighs only 2 lbs. with battery. **Retail price: £12/9/6.**



These and all other Aegis dependable products are made for Australian conditions!

AEGIS MANUFACTURING CO. PTY. LTD.

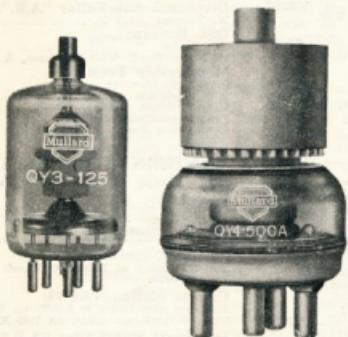
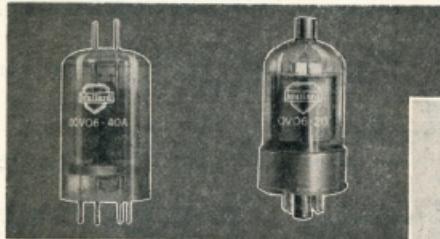
208 LT. LONSDALE ST., MELB., C.I., VICTORIA. PHONE: FB 3731

2/-

Registered at the G.P.O.,
Melbourne, for transmission
by post as a periodical.

V.H.F. POWER TETRODES

FOR F.M. AND TELEVISION TRANSMITTERS



Transmitter designers are now offered a complete range of V.H.F. tetrodes by Mullard. These high efficiency, high gain tetrodes make possible the design of transmitters with fewer valves and, consequently, reduced initial cost.

The higher overall efficiency of equipment fitted with Mullard tetrodes results in lower running expenses — a factor in the growing popularity of these valves in the world market. Further details of these tetrodes and other Mullard valves and tubes may be readily obtained from the address below.

PRINCIPAL CHARACTERISTICS

MULLARD TYPE No.	AMERICAN TYPE No.	CV TYPE No.	DESCRIPTION	BASE	HEATER (V)	V _a max. (V)	p _a max. (W)	TYPICAL LOAD POWERS AND FREQUENCIES (W) (Mc/s.)
QV06-20	6146	CV3523	V.H.F. Power Tetrode	Octal	6-3 1-25	600	20	52 25 60 175
QV1-150A	4X-150A	CV2519	V.H.F. Power Tetrode	BSF	6-0 2-6	1250	45	195 140 165 500
QQV03-20A	6252	CV2799	V.H.F. Power Double Tetrode	B7A	6-3 1-3 12-6 0-65	600	2 x 10	48 20 200 600
QQV06-40A	5894A	CV2797	V.H.F. Power Double Tetrode	B7A	6-3 1-8 12-6 0-9	600	2 x 20	90 60 200 475
QY3-125	4-125A	CV2130	V.H.F. Power Tetrode	BSF	5-0 6-5	3000	125	375 120
QY4-250	4-250A	CV2131	V.H.F. Power Tetrode	BSF	5-0 14-0	4000	250	1000 75
QY4-500A	4X-500A	—	V.H.F. Power Tetrode	—	5-0 13-5	4000	500	900 110
QYS-3000A	6076	—	V.H.F. Power Tetrode	Special 4-pin	6-3 32-5	5000	3000	4100 2600 75 220

Mullard

MULLARD AUSTRALIA PTY. LTD., 35-5 CLARENCE STREET, SYDNEY, BX2006
AND 123-129 VICTORIA PARADE, COLLINGWOOD, N.S. VICTORIA, 41-6644

ASSOCIATED WITH MULLARD LIMITED LONDON, MULLARD EQUIPMENT LIMITED AND MULLARD OVERSEAS LIMITED,
MT96



"AMATEUR RADIO"

The Wireless Institute of Australia was founded in 1910 to promote interest in Amateur Radio. Today each State has its own Division who is responsible for intrastate matters. Each elects a member to Federal Council who delegates to Federal Executive the task of implementing their decisions on Interstate matters. The Federal Executive is nominated by Victorian Division and these nominations are ratified by all Divisions.

Any person with an interest in Amateur Radio or Short Wave Listening may join the W.I.A. It is not necessary to possess an Amateur transmitting licence. Enquiries for membership should be made to the Secretary of the appropriate Division. Various affiliated clubs are in operation and transmitter hunts, s.w.l. meetings, v.h.f. groups and scrambles, etc., all form part of their activities, full details of which may be obtained upon application. All financial members of the W.I.A. regularly receive a copy of "A.R.", the cost of which is included in the membership fee.

The W.I.A. is a non commercial society with honorary office-bearers. Every Sunday the Divisions make official broadcasts from their WI transmitters and these sessions are designed to bring to all interested parties the news and views of that Division. Scheduled broadcast times are given below.

"AMATEUR RADIO"

P.O. Box 36, East Melbourne, C.2, Vic.

Editor: K. COCKING VK3ZFQ

Publications Committee:

G. W. Bates (Secretary)	VK3AOM
S. T. Clark	VK3ASC
J. C. Duncan	VK3VZ
J. A. Elton	VK3ID
R. S. Fisher	VK3OM
R. Hignighton	VK3EM
E. R. Monfald	VK3UJ
A. Roudie	VK3PZ
J. Vaille	VK3ZL
L. T. White (Cartoons)	VK3ZB
P. D. Williams	VK3ZC

Advertising Representative:

BEATRICE TOUEAU Phone: MF 4503
96 Collins Street, Melbourne, C.1, Vic.

Printers:
"RICHMOND CHRONICLE" Phone: JB 2419
Shakespeare Street, Richmond, E.1, Vic.

Publishers:
VICTORIAN DIVISION W.I.A.
478 Victoria Parade, East Melbourne, C.2, Vic.

Issued monthly on first of month. Subscription rate in Australia and Overseas is 24/- a year, in advance (post paid).

All Correspondence should be forwarded to:-

THE EDITOR,
"AMATEUR RADIO,"
P.O. BOX 36,
EAST MELBOURNE, C.2, VIC.

before the 8th of the month preceding publication. Technical articles should preferably be typed, double spaced, on one side of the paper, signed and numbered. All drawings should be lettered and done in Indian ink.

Books copies may be available; enquiries to P.O. Box 36, East Melbourne, C.2, Vic. Phone: 41-3353.

Any complaint regarding non delivery of "A.R." and change of address should be made to the Secretary of the member's Division and not to "A.R." direct.

FEDERAL EXECUTIVE

Box 2611W, G.P.O., Melbourne, Vic.

President: G. M. HULL VK3ZS

Secretary: J. R. LANCASTER VK3JL

Federal Councillors:

New South Wales: DAVE DUFF	VK3EO
Victoria: ALAN ELSTON	VK3AEL
Queensland: BERT HINKLER	VK4AO
South Australia: LES DUNCAN	VK5AX
Western Australia: RON HUGO	VK6KW
Tasmania: TED CRUISE	VK7EJ

Federal Contest Committee:

LON JENSEN, Manager
Box 8511W, G.P.O., Hobart, Tasmania.

(Acting) E. W. TREBILCOCK, 340 Gillies St., Thornbury, N.17, Victoria, Australia.

Awards Manager:

ALF KISSICK VK3KB
1 Maclaurin St., Brunswick, N.16, Vic.

NEW SOUTH WALES

14 Atchison Street, Crows Nest, N.S.W.

President: W. J. LEWIS VK2YB

Secretary: NORM BEARD VK2ALJ

is the official journal of the Wireless Institute of Australia and was first issued on 1st October, 1933, by authority of the Council of the Victorian Division, the present publishers.

Any person with an interest in Amateur Radio or Short Wave Listening may join the W.I.A. It is not necessary to possess an Amateur transmitting licence. Enquiries for membership should be made to the Secretary of the appropriate Division. Various affiliated clubs are in operation and transmitter hunts, s.w.l. meetings, v.h.f. groups and scrambles, etc., all form part of their activities, full details of which may be obtained upon application. All financial members of the W.I.A. regularly receive a copy of "A.R.", the cost of which is included in the membership fee.

The W.I.A. is a non commercial society with honorary office-bearers. Every Sunday the Divisions make official broadcasts from their WI transmitters and these sessions are designed to bring to all interested parties the news and views of that Division. Scheduled broadcast times are given below.

New South Wales (continued)

Meeting Night:

Fourth Friday of each Month at 14 Atchison Street, Crows Nest, N.S.W.

Official Station VK2WI:

Sundays, 1100 hours E.S.T. on 3575 Mc., 7146 Mc., and 145.0 Mc. Intrastate Call Backs taken on 7050 Mc.

S.W.L. Group:

Secretary: Gerry Albeck.

Meeting Night: Second Friday of Month.

V.H.F. Group:

Meeting Night: 1st Friday of Month.

Divisional Sub-Editor "A.R.":

Max Pleffer VK2MP

QSL Bureau:

Manager: Frank Hine VK2QL

14 Atchison Street, Crows Nest, N.S.W.

Membership Fees:

Full Member £2/2/0

Associate Member £2/0/0

£2/2/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

£2/0/0

Editorial



AMATEUR RADIO IS OUR HERITAGE

Words which might well be termed the Magna Carta of the Amateur Transmitter were once spoken in the House of Commons, words which set a precedent for which Amateurs throughout the Empire should be eternally grateful.

They were spoken in the year 1904 by the late Lord Derby, who as Postmaster-General during his second reading speech, brought about the first Wireless Telegraphy Bill. His words are worth recording for posterity because without his positive and futuristic outlook, Amateur Radio might never have been.

He spoke these words:

"**The class with whom I have the greatest sympathy,**" he said, "are those who wish to go in for experiments in the science of wireless, and I have been able to frame a clause which will give absolute freedom in that direction, merely requiring registration on the part of those who wish to engage in experiments. In a matter of this description the House will doubtless desire that the Act should be administered as liberally as possible, and I shall certainly do my best in that direction. For what it is worth, I will give an undertaking that no request for a license for experiments be refused unless the refusal has been approved by me personally."

This delightfully simple state of affairs did not, of course, prevail, which in these modern times is quite understandable. But it was this legislation which gave to the then technically minded people the opportunity to conduct the early experiments from which Amateur Radio was born; and from them on it was the Amateurs who lead the way in proving that world-wide communication was not only possible but offered to the commercial world an unbelieveable medium for communication.

For those generations which followed, "wireless" was an accepted part of living in the same way that the generation born today will accept television and other marvels of the current scientific age. And yet if we look backwards and realise the advancement in only fifty years of wireless and its allied fields, we can most certainly say that we have only touched on the possibilities of the future. Lord Derby envisaged the possibilities when he liberalised the first Wireless Telegraphy Bill so that technically interested people could experiment unhindered by regulations. Regulations were, of course, ultimately necessary, and as far as Amateurs are concerned experimenting is confined to the bands above 30 Mc. Nevertheless, Amateurs have proved their worth in the bands below 30 Mc. in a manner not thought about in 1904, and with more liberalised thinking on the part of those who administer the current Wireless Telegraphy Act, the Amateurs can go on being of service to Australia in many fields other than experimenting as it was known in the era at the turn of the century.

We have a heritage which, because of our relatively limited number, becomes clouded by the overwhelming contributions to our science by instrumentalities with unlimited financial resources. Our heritage is something for which we can be justly proud; a heritage worth fighting for. Let us all remember that we have it in our own hands to contribute something in the overall picture, and we should never let anyone forget it.

FEDERAL EXECUTIVE.

ANNUAL EDITION

"A.R." OCTOBER 1960

THE CONTENTS

The Tunnel Diode Story	4	A 6146 on 2 Metres	19	Amateur Radio Exhibition at Geelong, Vic.	27
Transistorised Converter for Mobile Work—the Easy Way	7	A 500V. 300 mA. Supply Using Silicon Rectifiers	21	Correspondence	29
VK2AQU Mark I.	10	Pedal Wireless Pioneer Passes On	22	SWL	30
Product Detector/Balanced Demodulator	15	Jamboree-on-the-Air	22	Sideband	31
S.W.R. Measurements with the TA-33 Jr. Triband Antenna	17	Feedback	23	Prediction Chart, October 1960	32
The R1155 Receiver—Part Two	18	Rules of the Australian DX Century Club Award	25	DX	33
		Contests	26	Notes	35

THE TUNNEL

R. L. WATTERS

THE tunnel diode reported in 1958 by Japanese scientist Dr. Leo Esaki, is an entirely new semiconductor device. It is like a diode because it has two terminals and like a transistor since it may be used to amplify power.

Although related to the transistor, the tunnel diode operates upon a different principle and offers advantages not found in transistors. Some of these are its very small size, extreme speed and stability under varying temperature conditions.

It is a new circuit element which may, with appropriate circuitry, function as a switch, amplifier and oscillator. Amplification and oscillation are possible well into microwave frequencies. At lower frequencies tunnel diode circuits may be simpler, smaller or more efficient than those of vacuum tubes or transistors. Let's see what this tunnel diode is and how it can be used in different circuit applications.

This new device gets its name from a mechanism called "quantum-mechanical tunnelling" (until now of only theoretical interest) which describes the manner in which electrical charges move through the device. The combination of this "tunnel effect" and the fact that the device comprises a p-n junction between two regions of very heavily doped semiconductor material has led to the name tunnel diode.

NEGATIVE RESISTANCE

The property of the tunnel diode produced by the tunnel effect is the negative resistance which appears over a portion of its voltage range. A negative resistance may be defined as a circuit element in which current decreases with increase in voltage (or vice versa). This negative-resistance property is illustrated in Fig. 1, which shows the current-voltage characteristic of a typical germanium tunnel diode at room temperature. The negative-resistance region of the curve lies between points A and B.

The slope of this curve at any point is the resistance of the tunnel diode at that point. A vertical region (infinite increase in current), for example, would indicate zero resistance while a horizontal region (no increase in current) would indicate an infinitely large resistance. In addition, a region which slopes upward to the right indicates a positive resistance while a region which slopes upward to the left indicates a negative resistance. An examination of the curve of Fig. 1 shows that the region from zero to A represents a positive resistance, the region from A to B represents the negative resistance and the region beyond B again represents a positive resistance. The current-voltage characteristic of the tunnel diode, therefore, has a region of negative resistance between two regions of positive resistance.

While the tunnel diode is related to the transistor, the semiconducting mate-

rial used is much more heavily doped with impurity than that used for transistors. It is almost metallic, and no hermetic seal is necessary for protection from such things as surface contamination and moisture penetration.

A p-n junction formed between a heavily doped body of p-type conductivity and a heavily doped body of n-type conductivity semiconductive material is very narrow, about one-millionth of an inch or less. It is this combination, with the proper forward bias, that allows a "tunnel" current to flow and produces the negative resistance. All we need to know about this tunnel current is that its transit time is so short that it does not affect the maximum operating frequency of the diode. This frequency limit is set by the junction capacitance and negative resistance of the device and the bulk resistance of the material from which it is made. A diode was recently made to oscillate at 10,000 Mc. However, for known materials, the calculated maximum frequency of oscillation is 20,000 to 30,000 Mc.

Now, how do we use the tunnel diode in a circuit? The current-voltage characteristic described above and shown in Fig. 1 is the key. Since the slope at any point of this curve is the resistance of the diode, this property of the diode may be conveniently determined from it. For example, the resistance at point D in Fig. 1 is

$$D = \frac{0.115}{-0.00011} = -1045 \text{ ohms.}$$

Notice again that between A and B the diode is a negative resistance, that is, the current decreases with increase in voltage. At points A and B, however, the resistance is very high. We can see this on the curve itself. In the vicinity of A and B there is little or no change in current with changes in voltage.

The location of points A and B of the curve are set mainly by the semiconductive material from which the tunnel diode is made. For germanium, the voltage at A is typically about 0.05 volt and at B 0.3. For silicon, on the other hand, the voltages are 0.07 and

0.4, respectively. Other materials have somewhat different values. However, all are in the forward voltage range of less than 1 volt.

PROPERTIES

To understand how to use the tunnel diode in various circuit arrangements, it will be useful to first explore some of its electrical properties. It will be convenient, therefore, to refer to the simple series circuit arrangement of Fig. 3. Then, in conjunction with Fig. 2, we will analyse the operation of the tunnel diode.

A current-voltage characteristic of a typical tunnel diode is shown in Fig. 2. The current through it is shown with respect to the voltage E_a across its terminals. Since the circuit of Fig. 3 is a simple series arrangement, the voltage E_a at any time is equal to the battery voltage E minus the voltage drop in the resistance R . It would be very useful, therefore, also to know the current flowing in resistance R with respect to the voltage drop in it. Load line F in Fig. 2 shows just this relation and a very useful tool is available from it. The intersection of line F with the voltage axis shows the battery supply voltage E while its intersection with the diode characteristic curve shows the voltage E_a .

Load line F may be used to represent the resistance R in the circuit of Fig. 3. While the slope of this line is negative and it appears at first that there is a decrease in current with increase in voltage, it must be remembered that the load line F does not show the current flowing in the resistance with respect to the voltage supplied, as is the case for the diode characteristic. Rather, it shows the current flowing with respect to the voltage drop in the resistance. For this reason, this negative slope is not to be confused with the negative-resistance region (A-B) of the diode characteristic.

The slope of load line F is determined by resistance R so that, having drawn

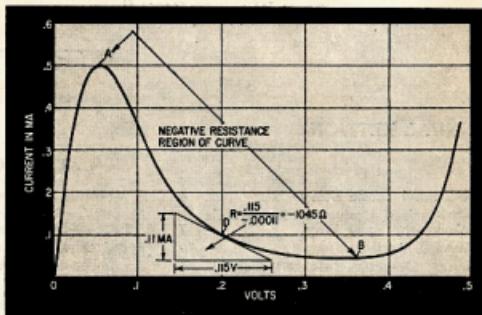


Fig. 1—Typical germanium tunnel-diode characteristic.

DIODE STORY*

and J. V. CLAEYS

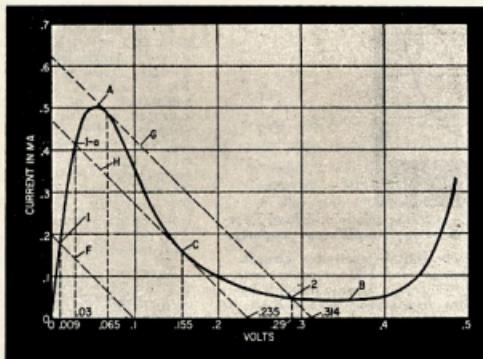


Fig. 2—Tunnel-diode characteristic with load lines for 500-ohm resistor in circuit of Fig. 3.

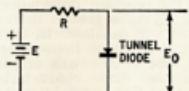


Fig. 3—Basic tunnel-diode circuit.

Fig. 4—Tunnel-diode characteristic and load lines of switching property.

a particular load line on the diode characteristic, one can easily find the resistance (R) necessary to establish it. For example, to find the R necessary to get load line F in Fig. 1, the slope is found from the voltage and current values taken from the curve. Line F's

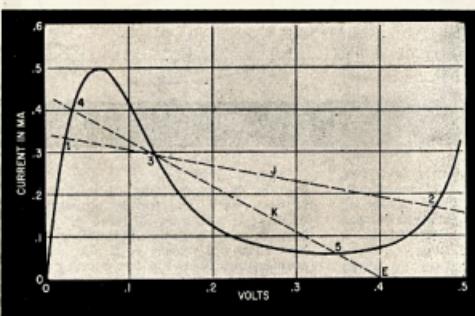
slope is equal to $\frac{0.1}{-0.0002} = -500$.

The value of resistance R is +500 ohms since, as stated above, the negative slope does not concern us here.

For the condition shown, $E = 0.1$ volt, $E_0 = 0.009$ volt and the current is 0.18 mA. Therefore, with the above values, the point of operation of the diode (for the circuit of Fig. 3), will be as shown at 1 in Fig. 2. Although the slope of this load line is fixed by the resistance R in the circuit of Fig. 3, a change in the battery supply voltage will change its location with respect to the current-voltage characteristic.

Now, let us increase the battery supply voltage. As this is done the load line moves up along the branch 0-A. When the intersection (or E_0) reaches a point near A, as shown by the load line G, the intersection (E_0) jumps almost instantly to the point 2 between B and C. Point 2 represents the new value of voltage E_0 .

If now we decrease the battery supply voltage E , the load line and its intersection will move toward the point C. Here it switches suddenly to the point 1-a on load line H and the lower value of voltage E_0 . Notice that the slope of the load line remains the same, since resistor R was fixed at 500 ohms



and only the position of the line along the voltage axis changes with change in battery supply voltage.

Load lines G and H show the battery supply voltages as 0.314 and 0.235 at the respective switching points. This shows that, as the battery voltage E was increased from zero, E_0 increased to 0.065 volt and then very suddenly switched to 0.29 volt. This is an increase in voltage across the diode (E_0) of 0.225 volt. Reducing the battery voltage to 0.235 volt then caused E_0 to switch suddenly from a value of 0.155 to 0.03 volt. This is a decrease in voltage across the diode terminals of 0.125 volt. Thus, we see that near the switching points A and C a very small change in the battery voltage produced a relatively

large voltage change across the diode. This property of the tunnel diode indicates one area of its usefulness.

SWITCHING

Load line J in Fig. 4 (using the circuit of Fig. 3) represents a value of resistance much higher than the negative resistance of the diode. Notice that this load line intersects the characteristic in both positive resistance regions. Thus there are two stable operating points for a single battery voltage E . The voltage across the diode can be either that corresponding to point 1 or that corresponding to point 2.

To show that only points 1 and 2 are stable, look at Fig. 4 and load line J. Now imagine for a moment that the current and voltage have values corresponding to point 3. If, for any reason whatsoever (motion of electrons, heat or anything else), there is a very small increase in the current, then by looking at the characteristic curve we can see that there must be a decrease in the voltage across the diode.

A look at the circuit shows us that, if this happens, there is more voltage available to send current through the resistance which causes a further decrease in the voltage across the diode. This action continues until point 1 is reached. At point 1, however, if there

* Reprinted from "Radio Electronics," copyright 1960, Gernsback Publications, Inc.

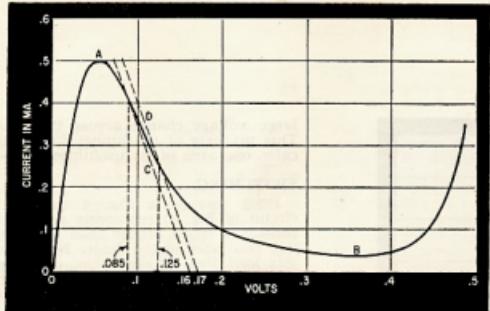
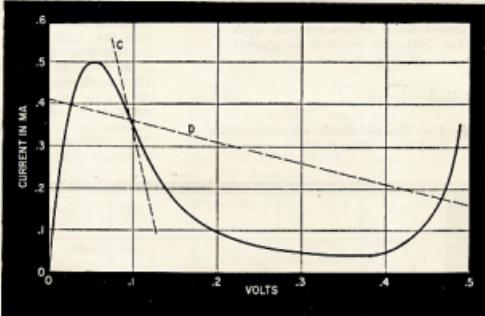
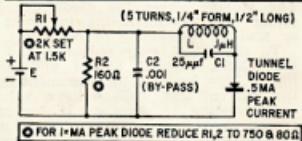


Fig. 5—Characteristic and load lines illustrating amplifying property.

Fig. 6—Tunnel-diode oscillator circuit. Values given are for 100-mc operation. Unit may be frequency-modulated by 2,000-ohm headphone across R₂.

Fig. 7—Characteristics and load lines illustrating oscillator operation.



diode operates at point 1, it is in its low-impedance state and a relatively large current may flow. When operating at point 2, it is in a higher-impedance state and the current is limited to a relatively low value.

Selecting a load line such as K in Fig. 4 with its corresponding battery voltage E will indicate how this change may be made more significant. For example, the current at point 4 on load line K for a germanium diode of about 0.5 mA peak current is 0.3 mA, and the slope indicates an impedance of about 150 ohms. However, the current at point 5 is 0.055 mA, and the slope indicates a very high impedance. Thus, the diode can be employed to switch impedances, currents or voltages if desired.

To use the tunnel diode as an amplifier or an oscillator, we must prevent it from switching. When we look at the diode characteristic curve we realize that, for this to be done, the value of resistor R must be less than the negative resistance of the diode. That is, the load line established by resistance R must have a steeper (more vertical) slope than the slope of the negative-resistance region between A-B (Fig. 1).

Such a load line is shown as C in Fig. 5. It always has only one intersection with the diode characteristic, making it possible to have an average bias in the negative-resistance region. The slope of region A-B for a typical germanium tunnel diode having a peak current at point A of about 1 mA, is about -100. Hence its negative resistance will be 100 ohms.

If now we choose a tunnel diode with a junction area 10 times as large (so that the peak current is 10 mA.), we find that the slope of the region A-B is steeper and the negative resistance is reduced to only 10 ohms. From this we can see that, as the diode's peak current increases, resistance R must decrease to prevent switching.

AMPLIFICATION

Now how can the tunnel diode amplify? Refer to Fig. 3 again and assume that the diode is biased somewhere between the points A and B and has a load line such as shown at C on the characteristic of Fig. 5 so that it looks like a negative resistance. This negative resistance is indicated as $(-R_s)$. Then:

$$(1) \frac{e_o}{e} = \frac{e (-R_s)}{R + (-R_s)}$$

$$\text{or gain } = \frac{e_o}{e} = \frac{(-R_s)}{R + (-R_s)}$$

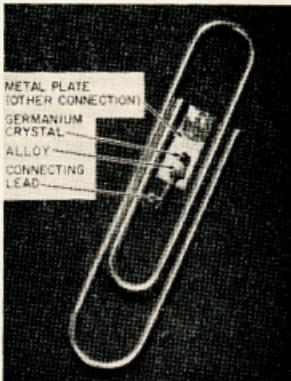
where e is a small a.c. voltage in series with the battery and e_o is the a.c. voltage across the tunnel diode.

From equation (1) we see that the gain is 1 when R = 0 and increases to a very large value as R approaches $(-R_s)$. This is shown graphically in Fig. 5. Lines C and D correspond to a resistance R of 150 ohms and battery voltages of 0.16 and 0.17 volts, or a change of 0.01 volt. At the same time we see that the voltage across the tunnel diode is 0.085 and 0.125 volt, respectively, or a change of 0.04 volt. Therefore, the gain = $0.04 \div 0.01 = 4$. We also see that, as the slopes of the lines C and D approach that of region A-B of the diode characteristic, the gain increases.

Now let us consider the circuit of Fig. 6. This arrangement can function as an amplifier or an oscillator, depending on the resonant impedance of the L-C circuit. Assume first that R₁ is adjusted so that the diode has a negative resistance, $-R_s$, and that R₂ is smaller than R_s so that we will prevent switching. If the resonant impedance of the L-C circuit is made greater than R_s, then the circuit will oscillate. If, on the other hand, the resonant impedance is less than R_s, the circuit will amplify. Fig. 7 shows the diode characteristic with the d.c. load line C established by resistances R₁ and R₂ and the a.c. load line D due to the resonant impedance of the L-C circuit in order for the circuit to function as an oscillator.

An important thing in regard to this is that the amplitude of the oscillation will build up until the average negative resistance of the diode just equals the positive resistance of the circuit at the operating frequency. For our purposes,

(Continued on Page 14)



An f.m. transmitter built around a tunnel diode. The microphone is in the upper right corner and the battery is covered by it. The tunnel diode is to the left of the mike.

Transistorised Converter for Mobile Work

S. E. MOLEN,* VK2SG

—the easy way

IT would appear from general observation that more and more people are going mobile each day, and with the roads and cars getting better, the trips are getting longer, which means more and more fun for the mobilists, which is as it should be. Various types of whips, transmitters and receivers are being constructed and used with varying degree of success.

Whips and transmitters are a field that books have been written about, and still everyone has their own ideas. Which leaves us with only the receiver to worry about, with some of the commercial car radios turning to hybrid and transistor, it is felt that we must follow this trend.

Let us firstly consider hybrid types of converters. The first thing we need is filament voltage and current. The best we appear to be able to do is 6.3v. at 300 mA., which has to come from the car battery and has to be filtered to get rid of ignition and other noises.

★ Adapt your car radio for Amateur reception by using this Converter. Even the XYL will not object to this one.

So it is good, now let's consider a car b.c. receiver. Most of them are 1 to 1 microvolt sensitive, signal-to-noise ratio is excellent, selectivity is, in most cases, 35 to 40 db. down 4 Kc. off the signal and the stability is excellent. So what's all this got to do with transistors? Well mainly this; using the car b.c. set as the second i.f., you have a very good potential for a communication receiver. All you need ahead of it is a good, stable, sensitive converter that is simple to build, without any outside power connections and no complications.

The converter about to be described was started at 1330 hours one rainy

sister gear, and this will hold good for all transistors. Well I guess the best way to consider the troubles is to point out what not to do with or near transistors.

One of the safest ways to work with transistors in new gear that you are building is to use sockets (there are sockets available for transistors, in Sydney Philips have them). They are a three-pin plug-in type and can be chassis mounted. Using these sockets, one can remove the transistor before each soldering job. One point with these sockets, the transistor can be plugged in either way, so mark the chassis for the correct polarity of the transistor.

When soldering transistorised gear, keep heat away from the transistors, they come unstuck very easily when they get hot. So keep the bit of the iron small and keep the heat radiation down. Use 12-gauge copper wire at the bit.

Do not use an iron with a.c. on the bit, such as Scope, etc. The a.c. can get into the transistors and they don't like a.c. voltage.

When checking the circuitry, do not use an ohm-meter while the transistors are in circuit as it is very easy to apply reverse voltage with an ohm-meter.

Before connecting the batteries, check the polarity of the battery, reverse voltage will kill the transistors. Positive goes to earth.

Connect a millamp. meter in series with the battery lead and keep your eye on it while making adjustments. Too much current can cause a runaway transistor and that's another one gone!

Don't try to increase the sensitivity by increasing the voltage beyond the maker's specifications, this can also cause a run-away.

And finally, don't use a g.d.o. on your coils with the transistors in circuit. As you will realise a g.d.o. puts out a fair bit of r.f. and the transference of energy to a resonant coil is quite large and thus this could cause damage to the transistor.

So there are your possible troubles, all of which can be overcome by using sockets and removing the transistors before making any soldering or troublesome adjustments to your gear.

PERFORMANCE

Now having got all that digested, that is the construction problem overcome, what other worries do we have with transistors? So we go back to noise, etc., etc. I fear you may have been given the wrong slant somewhere. At audio frequencies, transistors do show a relatively poor noise figure and it is very hard to get an amplifier to show better than -45 db., but at r.f. do

L5-B.c. band r.f. coil.
L6-30 turns No. 33 enam., close wound on cold end of L5.
NE-2-Neon from Command Receiver aerial terminal. (See text.)

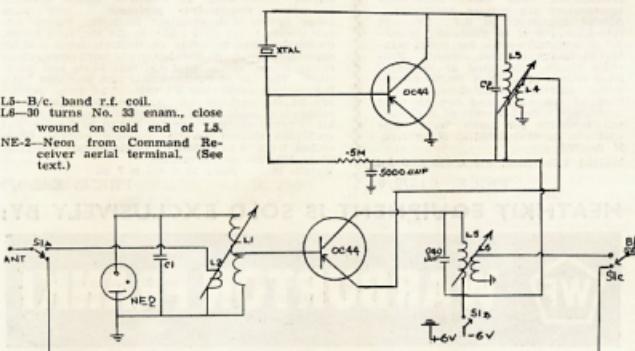


Fig. 1.—Circuit of Transistorised Converter.

As you see, it is starting to get difficult before we even get around to coils or h.t.

Alright, let's forget the hybrid types and pick up another train of thought—transistors. Now before you throw the book in the corner and sneer, "Transistors, they're no good, too noisy, no gain, too hard to use, etc., etc." let's look at your communication receiver. Is it one microvolt sensitive? What is the signal-to-noise ratio, better than 15 db.? Selectivity better than 40 db. down 4 Kc. off the signal? And lastly, what is the stability?

afternoon and, having wound the coils and wired the converter completely, it was in the car and working by 1700 hours that same rainy afternoon, which proves it must be simple.

Let's see how simple it is. What does it consist of? One crystal, one resistor, two transistors, three coils and four condensers, plus a switch and various nuts, bolts and a few bits of wire, batteries and that's it. Beat that, you value happy chappies.

CARE OF TRANSISTORS

Before getting on with the converter itself, let's think a little about the troubles one has while building tran-

* 17 Margaret Street, Strathfield, N.S.W.


HEATHKITWorld's Largest
Selling V.T.V.M.!**HEATHKIT****V-7A**
VACUUM
TUBE
VOLTMETER
KIT

Will measure A.C. volts (R.M.S.), A.C. volts (peak-to-peak), D.C. volts, resistance, and db. Zero centre scale db. range; convenient polarity reversing switch for D.C. operation, making it unnecessary to reverse test leads when alternately checking plus and minus voltages. Large 4½ inch meter; front panel controls consist of rotary function switch, rotary range selector switch, zero-adjust and ohms-adjust controls. Precision 1% resistors for high accuracy. The 11-megohm input resistance reduces "loading" of circuit under test, resulting in greater accuracy.

Handsome style in charcoal grey with drawn aluminium panel. Weight 7 lb. Size: 7½ x 4½ x 4¾ in.

PRICE: £24/14/0

Special wide range
Scope for
"Extra Duty"**HEATHKIT O-12**
"EXTRA DUTY"
FIVE INCH
OSCILLOSCOPE
KIT

The unique Heath patented sweep circuit in this unusual scope offers five times normal sweep found in other scopes. Wide band amplifiers make the O-12 ideal for colour T.V. servicing, specialised and general circuit investigation. Excellent linearity and lock-in characteristics reproduce a single wave even at upper frequency limits. Other features include push-pull vertical, horizontal output amplifiers, peak-to-peak calibrating source. Input to vertical amplifier has 3-step freq. compensated input attenuator. 11-tube circuit includes SUP1 cathode ray tube and provision for Z-axis input for intensity modulation of beam. Extremely short retrace time, efficient blanking action provide excellent display of essential T.V. waveforms. Positive trace position controls prevent bounce or overshoot.

Weight 22 lb. Size: 14½ x 8½ x 16 in.

PRICE: £70/6/0

World famous EASY-TO-BUILD ELECTRONIC UNITS

the LOW COST way to obtain highest quality equipment!

With every HEATHKIT you are assured of advanced circuitry and design, top quality components which are guaranteed to meet performance specifications—all fully imported from Britain or the U.S.A.! Building a HEATHKIT is so easy too—check-by-step instructions are simple to follow—even for a beginner.

Savings are up to 50% of the cost of comparable equipment.

Described here are just a few of the HUNDREDS of Heathkits available for Testing, Hi-Fi, Amateur Radio, Marine, etc.

Low Cost, Reliable R.F. Gen.**HEATHKIT SG-8 R.F.
SIG. GENERATOR KIT**

Provides extended frequency coverage in five bands from 169 Kc. to 110 Mc. on fundamentals and harmonics of the fundamental freq. Prewound and predadjusted coils make calibration unnecessary for service applications. Allows alignment of R.F. and audio test circuits of all kinds and is useful as a signal source for signal tracing in faulty receiver circuits. Provides stable, modulated or unmodulated output of at least 100,000 microvolts at 100 Mc. with 100% modulation at a freq. of 400 c.p.s. and can be used separately with 2.3 volts of A.F. output available for audio tests. The unit can be modulated at other freq. if desired.

Weight 8 lb. Size: 9½ x 6½ x 5 in.

PRICE: £15/8/0

A.T.V. Laboratory in itself**HEATHKIT TS-4A****T.V. ALIGN. GENERATOR KIT**

Practically a whole T.V. laboratory in itself; provides the essential facilities required for alignment of F.M., monochrome T.V. or colour T.V. sets. A controllable inductor in the all-electronic sweep circuit varies freq. by magnetic means assuring consistent, trouble-free performance and wide range sweep with excellent linearity. Sweep circuit covers range of 3.6 Mc. to 220 Mc. in 4 bands. Sweep deviation smoothly controllable from 0-42 Mc. depending on freq. Fundamentals used throughout entire range, eliminating spurious beats and parasites. The use of fundamentals also provides more precise alignment. Accuracy of the variable oscillator markers assured by calibration against 5.5 Mc. crystal supplied with kit. Crystal marker provides output at 5.5 Mc. and multiples thereof, while variable marker offers output from 19 to 60 Mc. on fundamentals and from 57 to 180 Mc. on harmonics.

Weight 16 lb. Size: 13 x 8½ x 7 in.

PRICE: £42/0/0

HEATHKIT EQUIPMENT IS SOLD EXCLUSIVELY BY:**WARBURTON FRANKI****Adelaide:** 204 Flinders St. - W 1711**Brisbane:** 233 Elizabeth St. - 31-2081**Melbourne:** 359 Lonsdale St. - 67-8351**Sydney:** 307 Kent Street - 29-1111**ORDER NOW** from your nearest office of Warburton Franki.

Fill out the order blank below, placing your name and address in the space provided at right and post with your requisition or money order. Orders will be delivered free from the metropolitan areas of Sydney, Melbourne, Adelaide and Brisbane. Orders from other areas will be sent "Freight Collect" by Passenger Rail to your nearest Railway Station. Please send the following Heathkits:

Item	Model No.	Price

EASY PAYMENT PLAN. If you wish to buy on terms, fill out order blank and post with our own money. We will forward you details of our Easy Payment Plan.

Please post details of Easy Payment Plan.

NAME _____

ADDRESS _____

TOWN _____ STATE _____ A.R.

Please post free CATALOGUE describing many items of stereo, marine, amateur and test equipment available in the big Heathkit range.

Band	Coil Details ($\frac{1}{2}$ " slug-tuned formers)	C1 (pF.)	C2 (pF.)	Crystal	I.F. Range
28 Mc.	L1—12 turns, No. 20 enam. tap at 4th turn. L2—2 turns, No. 20 enam. L3—12 turns, No. 20 enam. L4—2 turns, No. 24 enam.	15	15	9283 Kc. 3rd overtone	650-1600 Kc.
21 Mc.	L1—15 turns, No. 20 enam. tap at 5th turn. L2—3 turns, No. 20 enam. L3—15 turns, No. 20 enam. L4—2 turns, No. 24 enam.	15	15	6783 Kc. 3rd overtone	650-1100 Kc.
14 Mc.	L1—23 turns, No. 24 enam. tap at 6th turn. L2—5 turns, No. 24 enam. L3—26 turns, No. 24 enam. L4—3 turns, No. 24 enam.	15	15	4450 Kc. 3rd overtone	650-1000 Kc.
7 Mc.	L1—35 turns, No. 28 enam. tap at 10th turn. L2—6 turns, No. 28 enam. L3—40 turns, No. 28 enam. L4—4 turns, No. 28 enam.	33	33	6350 Kc.	650-950 Kc.
4 Mc.	L1—58 turns, No. 40 enam. tap at 16th turn. L2—8 turns, No. 33 enam. L3—80 turns, No. 33 enam. L4—5 turns, No. 35 enam.	40	40	2850 Kc.	650-1150 Kc.
1.8 Mc.	L1—140 turns, No. 40 en. tap at 25th turn. L2—10 turns, No. 36 enam. L3—100 turns, No. 36 en. L4—10 turns, No. 36 enam.	40	40	2700 Kc.	700-900 Kc.

Table 1.—Coil Information.

these figures worry us? Is their a communications set where, with the aerial terminals shorted to earth, you could get better figures than 30 db. noise? and that noise is coming from the i.f. valves, coils, audio, etc. So what of the —45 db. noise? Not much good for broadcast stations maybe, but certainly better than most communications sets, so it appears as though noise is not the problem.

Sensitivity is equal to, and in most cases, better than the usual run of r.f. and mixer valves.

Stability.—As we have no warm-up period, we have no heat drift, and as with this unit it is crystal locked, so all we have to consider is the drift of the b.c. receiver which is small enough to be disregarded.

Considering all the above points, it rather looks as though our mobile receiver is starting to look like a good communications receiver without some of the refinements such as crystal gates, b.f.o. and S meter, etc., but very useable as a mobile unit with no worry regarding power supply.

SIMPLICITY

Having overcome your horror of transistors, I hope, let us consider the transistorized mobile converter. As with all converters for mobile work they must be small, efficient, simple and able to be set up in the car without complicated power connections. This unit is built in one section of an AR7 coil box so that with a complete AR7 plug-in, one could have four converters complete with batteries for each unit. Small enough?

the XYL objects to the many dangling devices that some of us so frequently mount in plain sight under the dash.

Special consideration was given to the stability of the unit. For this reason the author decided to incorporate crystal controlled on the oscillator circuit. This not only contributes to stable operation, but reduces the complexity of the initial adjustment.

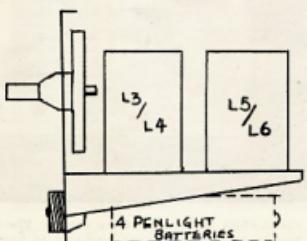
The oscillator circuit is a transistorised version of the ever popular triode Pierce. There is nothing tricky about the operation. Injection for the mixer is taken from a small link which is wound over the cold end of the oscillator tank coil. The emitter of the mixer transistor is returned to ground through this link. The mixer circuit corresponds to a triode vacuum-tube mixer utilising cathode injection from the oscillator, the major difference being the low input impedance of the transistor base as compared with the relatively high input impedance of a vacuum-tube grid. The crystal used in the oscillator portion of the converter is of the surplus variety for fundamental operation. Although many surplus crystals lend themselves to overtone operation quite readily, the author has experienced difficulty on various occasions in getting some of them to oscillate easily in the overtone mode, and more satisfactory results should be obtained by using overtone crystals for 20, 15 and 10 metre operation.

The inductances are wound on slug tuned forms and shunted with the capacitances shown in Table 1.

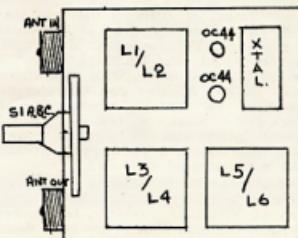
The circuit shows a NE-2 neon connected from the high impedance end of L1 to ground, this gives a measure of protection for the mixer transistor in the event that an unsafe amount of r.f. energy is introduced into the converter. A zener diode, such as the ZA-6, may be substituted for the NE-2 and will break down at a lower voltage (6) to give better protection.

The converter requires 6 volts d.c. for operation and takes on the order of 2 mA. of current. For all practical purposes four penlite cells, series connected seem to be logical choice for powering the unit. The choice of dry cells serves two important purposes. First, it eliminates one of the prime sources of ignition interference, various noises from the electrical system of the car are carried into the converter via the leads which supply power to it. By using self-contained batteries, this possibility is eliminated. The second appealing feature from the

(Continued on Page 23)



Figs. 2 and 3.—Suggested layout drawn for a 3" square chassis, to fit a 3" cube box.



VK2AQU Mark I.

C. G. HARVEY*

* Proof that single sideband gear can be built by any Amateur. This article may tempt you to cut your carrier and join the ranks of sidebanders.

LOOKED at the cost of Commercial 100 watt p.e.p. s.s.b. stations lately? Sure they look nice, but the change out of a thousand db. wouldn't buy a life membership of the Institute!

If you have a junk box, and perhaps a fiver or so for an audio p.s.n., and the inevitable odd capacitor and resistor, etc., whose value never seems to be in the box when wanted, you too can have a kiloquid's worth of fun.

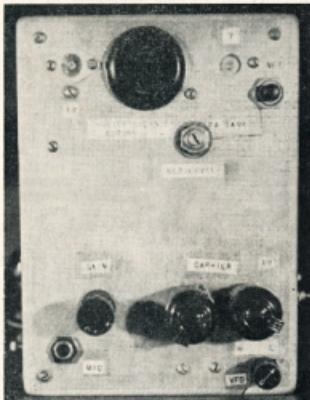


Fig. 2.—Front view of the exciter. The tuning indicator has been removed. Note the interlock push switch at top right for easy checks on netting accuracy. Simple enough?

Probably, like I was in 1958, you have been frightened off s.s.b. by theoretical articles on lattice filters or linear amps., or even by the fear that a shack full of test gear is necessary to get going. This happened to me until my old friend, Bud VK2AQJ, provoked me into belated action with well aimed VOX tactics. Another c.w. operator bit the dust for certain, when, after a week-end's work, a few old tubes, potentiometers and old fashioned 1 watt carbons produced a VOX which worked like a charm first up.

It is not the intention here to sell s.s.b. or to give a nut by volt description of VK2AQU circuitry, but rather to show one way that it has been done, successfully, without ever having seen

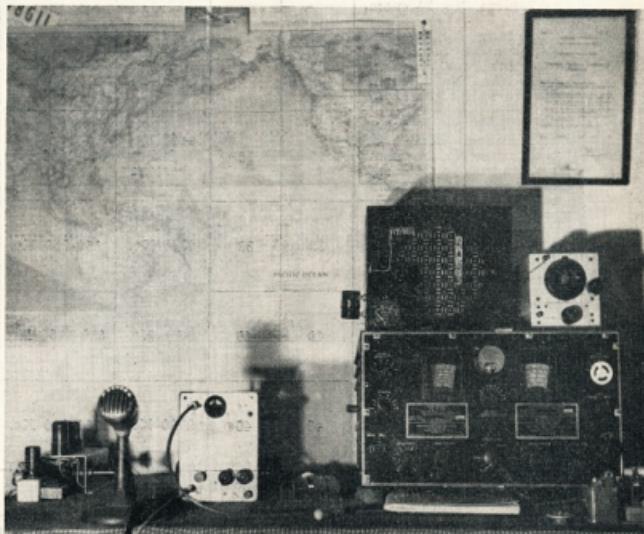


Fig. 1.—VK2AQU 1960. The VOX can be seen at the left of the s.s.b. exciter. The small unit in front of the VOX is the 1,000 c.p.s. tone oscillator. Two important aids to s.s.b. operation are the Teledex and egg-timer (centre). The field strength meter provides a continuous check on speech level.

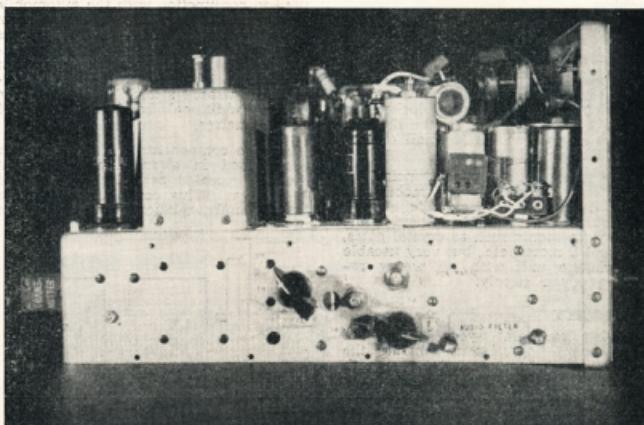


Fig. 3.—Left hand view of the chassis. The metal film cassette next to the 12K3 signal mixer was an after-thought found necessary to keep induced r.f. from the p.a. out of the low level grid circuit. The audio filter label refers to the slugs of two t.v. width coils used as a low pass filter. The magic eye fits in above the shielded xtal and the p.s.n. at the right of the chassis.

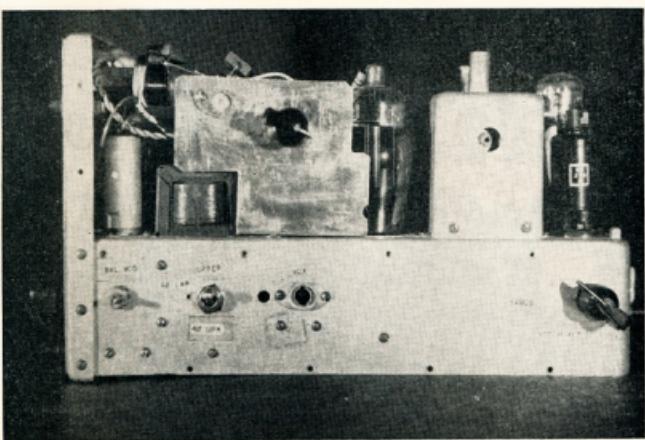


Fig. 4.—Right hand view. The 1623 was used intentionally to bring the plate tank circuitry above deck level. One of the balanced modulators can be seen at the left.

another s.s.b. rig. This isn't to say I would do it again this way, but my initial experiences may consolidate your own views. Lots of a.m. stations have expressed interest in s.s.b., but because they don't really yet know what is involved, are hesitant about committing themselves.

The accompanying photos and drawings may give them the necessary incentive to "have a go" particularly as the station has been active long enough for many Amateurs to know how it performs. Table 1 is the heart of the problem because once you know what levels you are dealing with, any competent Amateur can use the components he has available to get the stage gains necessary. Simply remember that experimenting is not encouraged in the critical audio p.s.n., where changes of 1 degree in phase shift (or 1% in audio gain in the p.p. stage after the network) will adversely affect the unwanted sideband suppression. With the figures mentioned, you should get about 40 db. suppression, although half this is useable (but not desired) on the bands at present. However, I strongly suggest you spend a couple of db. on the Australian Aswel commercial network, and remove any doubt as to eventual performance. This then is the only unavoidable expense.

Anything that is serviceable can be put to use in the rest of the gear, pride permitting. My pride permits me to use some components that put VK3UO on the air in 1936—so don't be bashful. In fact VK3 Amateurs who remember René Millar and Charlie Vaude might sense that the exciter front panel is an old aluminium acetate disk of these pre-war minstrels.

Another critical field is bias and drive. Treat the exciter as though it was a hi-fi amp, run it Class A, and quietly at that; keep the load impedance correct and low, keep it stable, and give it lots of reservoir capacity in the power supply.

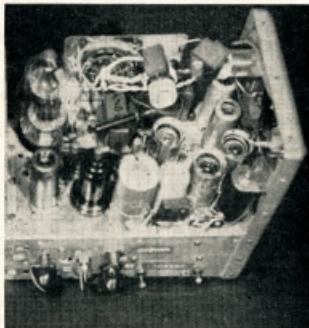


Fig. 4a.—Part of top view of the chassis.

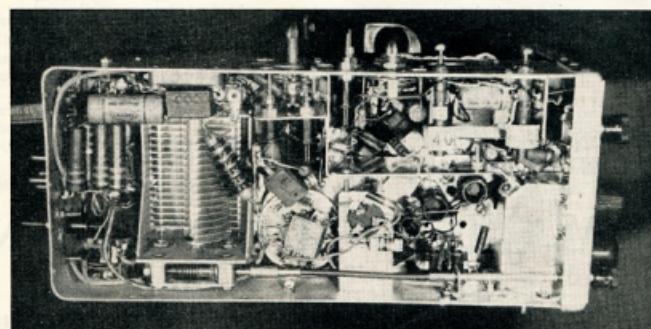


Fig. 5.—Don't let this frighten you off! A bit of thought in wiring procedure and shields cut to allow bottom layer components to lie in the best direction, do the trick. The r.f. p.s.n. can be seen top left, and the completely shielded balanced modulator circuitry is next door. The point one, bottom right, was needed to shift a 7 Mc. resonance in the h.t. wiring!

TYPICAL TEST CONDITIONS

Audio input	0.15v., 1,000 c.p.s.
Bal. Mod. inputs	0.35v. and 0.58v., 1,000 c.p.s.
Signal mix., grid	1.2v., 8.8 Mc.
Signal mix., plate	2v., 7 Mc.
Buffer plate	6½v., 7 Mc.
Driver plate	12.5v., 7 Mc.
VOX input	4v., 1,000 c.p.s.
V.f.o. output	8v., 5 Mc.
Signal Mixer injection	1½v., 1.6 Mc.
P.s.n. inputs	0.1v. and 0.6v., 1,000 c.p.s.
Balanced audio outputs	1.1v. and 1.3v., 1,000 c.p.s.
HT, on load	300v. d.c.
Cut off bias	200v. d.c.
Mixer cathode	3½v. d.c.
Driver cathode	21v. d.c.

All measurements made with high grade v.t.v.m., with audio level set to arbitrary level, below flat topping point.

* Swamped by 4.7K.

Table 1.—The real trick to getting going on s.s.b.—knowing what to expect!

No one circuit will suit everybody, so play about with the many ideas that fill the pages of the A.R.R.L. Sideband Handbook and the "CQ" Sideband Handbook.

I used a Command chassis simply as a matter of convenience. You can find space to bandswitch three bands if you try hard, but I decided to remove the third band when more shielding was needed than originally provided. Best put the shields in first and be sure, rather than find them necessary later and have no room! Treat the exciter like the r.f. end of a hot receiver and there'll be no trouble that swamping or loading won't cure. Don't forget the field from the s.s.b. generator is fairly strong and can get into low level mixer and balanced modulators unless tied down with aluminium.

V.f.o. stability is a re-requisite. There must be negligible random drift otherwise resolved speech quality will suffer and of course long term stability must be better than 100 c.p.s. if you want to

A Brief Selection of our very Large Range of BOOKS ON RADIO & TELEVISION

	Price Post.		Price Post.	
A.R.R.L. Antenna Book, American Radio Relay League	31/- 1/3	Pin-Point Transistor Troubles in 12 Minutes, Louis E. Garner, Jr.	61/9 2/-	
Antennas, Alexander Schure	15/6 1/-	Pin-Point T.V. Troubles in 10 Minutes, Coyne Electrical School	41/3 1/9	
A Primer on Television Tape Recording, George B. Goodall	17/- 1/-	Popular Mechanics Fix-It-Yourself Television Manual, John Derby	8/9 9d.	
Australian Radio Amateur Call Book, Wireless Institute of Aust.	6/- 9d.	Practical Electronics, Electronics Illustrated	8/6 9d.	
An Approach to Audio Frequency Amplifier Design, General Electric Co.	17/6 1/-	Practical Stereo Handbook, Clive Sinclair	5/3 9d.	
Basic Theory and Application of Transistors, Department of the Army	16/3 1/3	Professional T.V. Repair Secrets, Art. Margolis	8/6 9d.	
Beam Antenna Handbook, William I. Orr	32/6 1/-	Quad Antennas, William I. Orr	34/3 1/6	
Boy's Book of Crystal Sets, W. J. May	3/9 9d.	Radar Circuit Analysis, Department of the Air Force	41/6 1/6	
Circuits for Audio Amplifiers, Mullard	12/6 1/-	Radar System Fundamentals, Bureau of Ships and Bureau and Aeronautics, Navy Department	19/- 1/-	
Command Sets, The Editors of "CQ"	15/6 1/-	Radio Amateur's Handbook, American Radio Relay League	46/3 1/6	
Correcting Television Picture Faults, John Cura and Leonard Stanley	6/- 9d.	Radio Amateur Licensing Handbook, Jim Kitchin	22/3 1/-	
"CQ" Amateur Radio License Guide, Barry Briskman	25/9 1/6	Radio Construction and Repairs, W. Oliver	17/6 1/-	
"CQ" Anthology, The Editors of "CQ"	20/9 1/6	Radio Engineer's Pocket Book, F. J. Camm	10/- 9d.	
Electronics for the Beginner, J. A. Stanley	41/3 1/6	Radio Receivers, Department of the Air Force	32/6 1/6	
Electronics Made Simple, Henry Jacobowitz	11/6 1/-	Radio Servicing for Amateurs, L. G. Furley	5/- 9d.	
Foundations of Wireless, M. G. Scroggie	25/- 1/6	Radio, Television, Industrial Tube, Diode and Transistor Equivalents Manual, B. B. Babani	14/3 1/-	
Germanium and Silicon Transistors and Diodes, Miniwatt	12/6 1/-	Radio Transmitters, Department of the Air Force	25/9 1/6	
Guide to Mobile Radio, Leo. G. Sands	20/- 1/3	Rapid T.V. Repair, G. Warren Heath	35/3 1/6	
Ham Radio Handbook, Robert Hertzberg	8/6 1/-	Shure Bros. Reactance Slide Rule, Shure Bros. Inc.	18/6 9d.	
Hi-Fi Annual and Audio Handbook, Electronics World	14/6 1/-	Sound Reproduction, G. A. Briggs	27/6 9d.	
Hi-Fi Guide and Yearbook, 1959, Popular Electronics	7/6 9d.	Surplus Radio Conversion Manual, Volume 1, R. C. Evenson and O. R. Beach	38/6 1/6	
High Fidelity Loudspeaker Enclosures, B. B. Babani	14/6 1/-	Surplus Radio Conversion Manual, Volume 2, R. C. Evenson and O. R. Beach	38/6 1/6	
How to Make Good Tape Recordings, C. J. Le Bel	20/9 1/-	Surplus Radio Conversion Manual, Volume 3, William I. Orr	32/6 1/6	
Know Your Oscilloscope, Paul C. Smith	20/9 1/-	Surplus Schematics Handbook, Kenneth B. Grayson	25/9 1/6	
Learning Morse, Wireless World	1/9 9d.	Tape Recorders and Stereo, Lee Sheridan	18/6 1/-	
Loudspeakers, G. A. Briggs	29/6 1/6	Technical Data, Miniwatt	7/6 9d.	
Model Radio-Control, Edward L. Safford, Jr.	31/9 1/6	T.V. Fault Finding, The Radio Constructor	20/9 1/-	
Modern T.V. Circuits and Fault Finding Guide, L. G. Furley	6/9 9d.	T.V. Servicing Guide, Leslie D. Deane and C. C. Young	8/9 9d.	
101 Ways to Use Your Audio Test Equipment, Robert G. Middleton	25/9 1/-	Understanding Transistors, Milton S. Kiver	9/6 9d.	
101 Ways to Use Your Oscilloscope, Robert G. Middleton	25/9 1/-	Using an Oscilloscope, D. W. Easterling	V.H.F. Handbook, William I. Orr and H. G. Johnson	35/6 1/6
101 Ways to Use Your Sweep Generator, Robert G. Middleton	20/9 1/-	World Radio Handbook, O. Lund Johansen	25/- 1/-	
Performance-Tested Transistor Circuits, Sylvania Electric Products	4/6 6d.			

McGILL'S AUTHORISED NEWSAGENCY

"Established a Century"

183-185 ELIZABETH STREET, MELBOURNE, C.I., VICTORIA

"The Post Office is opposite"

PHONES: MY 1475-6-7



Fig. 6.—Test gear? I get by with a g.d.o. (right) modified to provide a small diameter linked coupling coil which will reach into the innards during initial setting up of the slug-tuned coils. The same link fits the field strength meter, so either can be used for tune-up once the band has been found. All output adjustments are made against the field strength meter (centre). The helix provides more than enough r.f. input. The c.r.o. (see Fig. 7) gets its r.f. input via the small link on the left and a tuned circuit in the end coil can adjust.

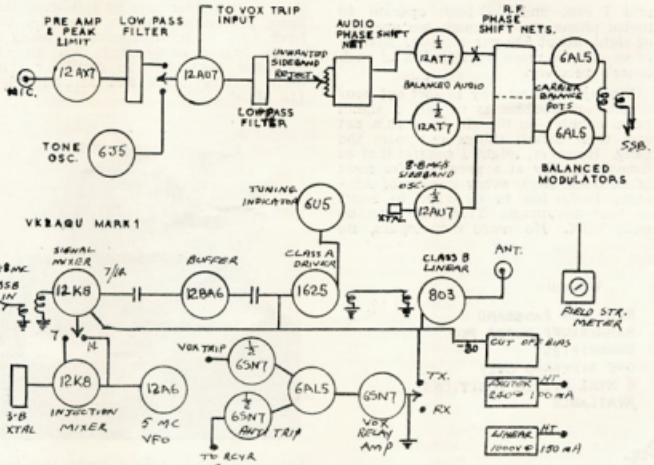


Fig. 8.—This is the block schematic. It looks complicated because it is strange. It is much less difficult than t.v. Any reasonable combination of tube types can be used to suit your ideas.

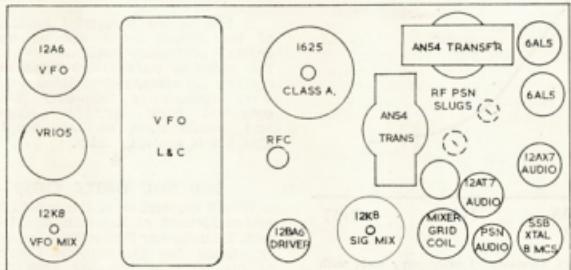


Fig. 9.—The bird's eye view. It looks worse in the photo, because all the output tank circuit switching appears to clutter things up. This doesn't matter, it can't been seen with cover on.

stay in multi-station s.s.b. nets without comment. This order of stability is relatively easy to achieve if you use your commonsense.

The only real troubles here at VK2AQU have been caused by two faulty screen dropping resistors in the mixer circuits, giving intermittent and finally low output, instability when buffer and driver were tuned to resonance with the p.a. on, and unstable carrier suppression caused by improper earthing of butt-joined shielding which allowed r.f. hotspots to develop when the p.a. was radiating.

This instability problem wasn't recognised for what it was until I had tried half a dozen different fixes, including a grounded grid buffer. Eventually, I discovered that the volt or so input to the mixer grid became a magic 7 volts with the p.a. radiating! A shielded grid coil provided an immediate fix and would have saved a lot of hair-scratching had the cause been recognised earlier. So, take a hint OM. Shield things adequately at the start. Even wire in shielded cable if you like, be-

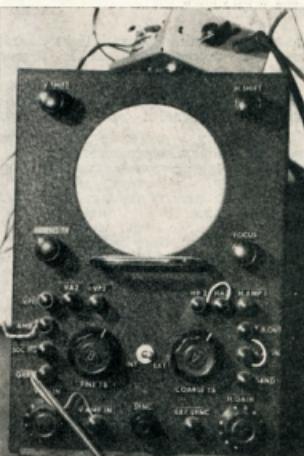


Fig. 7.—Cathode Ray Oscilloscope. I do use a c.r.o. for p.s.n. line-up, it's a conventional audio type, seen here with the microphone pre-amp. on top and under test.

cause it all helps. T.v.i. is almost a thing of the past with s.s.b. using this type of constructional technique.

In regard to design technique, Ohms Law and the A.R.R.L. Handbook are adequate. It's a different story though, if you wish to calculate and design load impedances for the Class B linear, because the Handbook tables are for Class C conditions, which are n.b.g. if you want soup from a s.s.b. linear. Better to use the rule of thumb, "20 mx coils for 40 mx s.s.b., 40 mx coils for 80 mx s.s.b.", then trim them to frequency with sufficient C for resonance. It is better to have too much C than too little.

In regard to low level transmitter mixers, follow normal receiver design; keep the injection volts down to a low

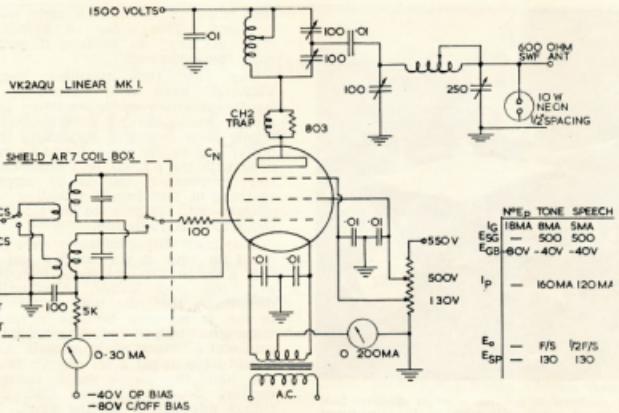


Fig. 10.—Don't let Linear Amplifiers bluff you. This one used to be a Class C c.w. amplifier and doesn't know any difference now it has a new grid circuit and more C in the plate tank.

value and don't try and light a pea lamp off the plate of a 12K8! If you overdrive **any** stage, the signal won't sound good, and if a mixer is involved, the chances of spurious radiation of the primary frequencies are very high.

This is why I prefer to mix at low level, but other experimenters have had success mixing after one stage of 8 meg. amplification. By keeping things running quietly, nearby Amateurs will not be inconvenienced and their a.m. receivers with a.v.c. "on" won't leap off the table every time you make with the duck chatter. For example, VK2OZ

and I can, and do, both operate 40 metre phone, even though we are line of sight, about 500 yards apart. Neither of us occupy more than 10 Kc. of each other's receiver.

Finally, the best way to sort out your doubts or troubles is to put a signal (a.m. counts) on the air, in a s.s.b. net and then thrash things out with the gang. However, might I suggest that as time is usually at a premium for most of us these days, every minute of Amateur Radio has to be made to count to best advantage. This, one can do with VOX. No more monologues, no

more rockets for being late for meals, no lost time due to QRM or QSB, only man-to-man human contact, question and answer, and an immediate check on cause and effect when testing.

So, if you can't manage VOX first off, please include push-to-talk—it will help others to help you. VK2AQU Mk. I. is the way I get more out of Amateur Radio in 1960—there are a thousand other ways. How about you having a go at regular trans-Pacific phone on 40 mx? It's there for the asking—with s.s.b.! Come and join the net!

TUNNEL DIODE STORY

(Continued from Page 6)

it is sufficient to know only that this means that the diode still has a negative resistance while it is oscillating. We can make further use of this by adding another parallel-tuned circuit, tuned to a different frequency, in series with the oscillator tank. This circuit "sees" a negative resistance. If its resonant impedance is slightly less than the impedance of the oscillator tank, it will amplify at this new frequency. We can add still another tuned circuit and use it as an amplifier also by following the same procedure. As an example, we have had a circuit operating, using a single tunnel diode, that was an r.f. amplifier (100 Mc.), an oscillator (110 Mc.), and a mixer and i.f. amplifier (10 Mc.)!



Laboratory style tunnel diode (original prototype). Semiconductor bodies are alloy and germanium crystal.

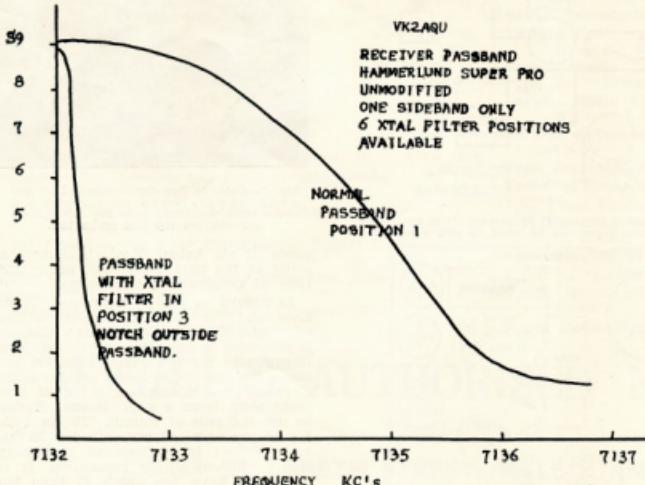


Fig. 11.—It's nice to have razor-edge selectivity, but it isn't necessary. I often copy s.s.b. with the receiver passband as at position 1. Of course when the going gets rough or I want some more db's. of S:N ratio, in goes the selectivity. This is why you mightn't be heard if you don't zero in accurately!

A few of the successful applications of the tunnel diode are as quartz-crystal controlled oscillators, utilising the series or parallel resonance of the crystal; frequency-modulated oscillators; regenerative frequency dividers; counters; logic elements; amplifiers and combination oscillator-amplifiers. The list is growing daily.

DID YOU WRITE THIS?

Would the author of the article "Simplified Method of Determining Modulation Transformer Ratios" please promptly advise the Publications Committee of his name as this has been mislaid and is required for credit titles on the article.

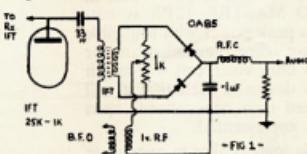
Product Detector/Balanced Demodulator

LESTER A. EARNSHAW,* ZL1AAX

THE SIMPLEST YET!

Recent investigations into the balanced demodulator for single sideband reception showed this circuit to be even simpler than the product detector. (In actual fact, of course, there's little difference between the two. Both mix the signal with the b.f.o. and extract the wanted difference. Perhaps a more exact definition is that the product detector output is the arithmetical product of the two inputs, whereas the demodulator output is the geometrical mean of the two inputs. And even this does not always apply! But that's by the by.)

A balanced modulator is familiar to most. We use it to modulate the carrier and then we balance out the carrier and leave but the two sidebands (which makes a delightfully simple double sideband rig). Note that the balanced modulator performs two separate functions: (a) It mixes the audio with the carrier, and (b) it balances out the carrier. As a rule both operations are performed simultaneously, but this need not always be the case. If the carrier is applied to the balanced modulator in, say, the parallel mode, then the output must be connected in push-pull if carrier cancellation is to be obtained. Or conversely, if the input is in push-pull then the output must be in parallel.



Just as the balanced modulator may be used to mix the audio with the carrier, so may the modulator be used to mix a carrier (b.f.o.) with a signal to produce a difference or audio output. Only now we call it a demodulator. This process may be performed by most of the conventional balanced modulator systems, but that shown in Fig. 1, which was arrived at only after much deliberation and experimentation, has a number of important advantages. These may be listed as follows:

- (a) No tapped i.f.'s, coils or audio transformers are required.
 - (b) Because the carrier is applied in parallel and the signal in push-pull, it is not possible for b.f.o. voltage to be fed back into the i.f. amplifier to the detriment of the a.g.c. system. This latter point is important and will result in a false a.g.c. voltage being developed and applied to the front end of the receiver. Weak signals will consequently be lost.
 - (c) Only about 1 volt of b.f.o. volt-

[View in browser](#)

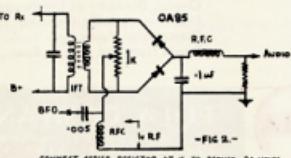
- (d) Although the demodulator places a half wave load on the b.f.o., the opposite and equal action of the diodes holds the load constant. This reduces the tendency toward f.m. modulation of the b.f.o. by the signal. This last reason is important in transistor circuitry and was the cause of attention being paid to the balanced demodulator as a sideband detector.
 - (e) B.F.O. harmonics are negligible.
 - (f) Output is low impedance and of an order which makes matching between transistor circuits and the demodulator ideal.
 - (g) Simplicity and economy of components.
 - (h) No fussy adjustments to make.
 - (i) High audio output. Sufficient to drive the usual receiver audio such as a 6AV6 to a 6AQ5 to overload providing a 1/6 step-up transformer is used. Without the transformer, output is still reasonable.

CONSTRUCTION

The components may be mounted on a tag board and placed in a convenient part of the receiver chassis or cabinet. The b.f.o. and signal input leads must be shielded. R1 may be a 1,000 ohm potentiometer or two 470 ohm resistors. A potentiometer will allow the perfectionist to adjust for a null of the a.m. signal when the b.f.o. is off. If there is more than a "whisper" of output when the b.f.o. is off, the detector is functioning incorrectly. By moving the potentiometer to one side of its range, a.m. operation will take place in the normal manner although output will be down compared with the side-band condition.

The two diodes should be approximately matched for equal **forward** resistance. Their reverse resistance is of little consequence. Preferably choose diodes with a low forward resistance.

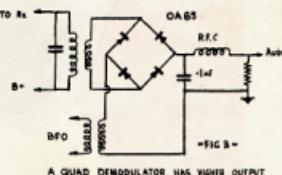
Almost any transistor i.f. transformer may be used at IFT1. Ideally this should be about 25K to 1,000 ohms for transistors but for tubes or transistors this is not critical. The transformer may be directly connected to the last i.f. amplifier plate or collector, or capacitively coupled in the manner shown.



THE R.F.O.

The b.f.o. is an important part of any sideband detection system. A transistor b.f.o. should be followed by a buffer-amplifier stage. A tube should be a pentode with the oscillatory circuit between the cathode and screen. Output to the demodulator should be taken from the plate either through a step-down transistor i.f. transformer or through a capacitor. In the latter case an r.f. choke should be connected from the potentiometer moving arm to ground. B.f.o. voltage at the potentiometer should be approximately 1 volt or more. There is little point in using a very large b.f.o. voltage and, in fact, this may possibly produce troublesome harmonics. Surplus voltage should be dissipated in a series connected resistor. **Insufficient b.f.o. voltage will result in severe distortion of the signal.** With a two-stage i.f. in the receiver, output from the secondary of the transistor i.f. should not exceed about 0.2 volt. A higher output here will create distortion unless the b.f.o. voltage likewise is increased. A ratio of 10/1 on average signals with the maximum certainly not exceeding 5/1 will give the best all-round results.

Remember this: when the signal voltage exceeds the b.f.o. voltage, you have a bad case of overmodulation taking place in your own receiver!



THE QUAD REMODULATOR

In Fig. 1 the two halves of the potentiometer make two legs of a bridge circuit of which the two diodes were the other two legs. By replacing the two resistors with two more diodes, we increase the output of the demodulator by about two. Advantage of this system is that the demodulator now imposes a full wave load upon the b.f.o. and as a consequence there is less likelihood of f.m. modulation by the signal. The increased output comes from the lower forward resistance of the diodes, this being appreciably lower than the value of resistors they replaced.

IN GENERAL.

It is indeed surprising that Amateurs have not made greater use of the balanced demodulators in s.s.b. telephony. The very simplicity of these non-power consuming devices make them particularly attractive. It is pointed out that a great number of similar and different configurations were bypassed. Perhaps

"lovely
to
listen
to"



The New **ROLA**
STEREO MASTER
model **I2 PX**



Here is the loudspeaker for which you have been waiting, a true high fidelity loudspeaker at the price you want to pay. Yes, in every respect the new Rola STEREO MASTER 12PX is outstanding. It will handle a full 20 watts peak power with negligible distortion. It has a frequency response more than adequate for even the most tone conscious. Its 15 ohm voice coil will match standard hi-fi amplifiers. Further, its design is such that it will give good bass response when mounted in a conventional open back cabinet — a vented enclosure is not essential.

You'll really have to hear this new Rola loudspeaker to appreciate how good it really is.

You'll marvel at its fine "bass", its smooth "middle" and clean "top" and at its overall liveliness due to its excellent transient response.

You'll want to own a Rola STEREO MASTER 12PX (two if you're a Stereo fan). It's the best medium priced wide-range loudspeaker ever developed and, speaking of price, it's only £15.5/-.

VENTED ENCLOSURES:

If you wish to mount your Stereomaster 12PX in a vented enclosure, write for our 8 page brochure giving full construction details.

SPECIFICATIONS

Power Handling Capacity	20 Watts Peak
Diaphragm:	
Fundamental Resonance	50 cps
Frequency Response	45 cps — 12 kc
Voice Coil Impedance	15 ohms at 400 cps
Air Gap Flux Density	12,800 Gausses
Total Gap Flux	87,000 Lines
Principal Dimensions:	
Overall Diameter of Diaphragm Housing	12 ³ / ₁₆ "
Diameter of Baffle Opening	10 ¹¹ / ₁₆ "
Diameter of Voice Coil	1 ¹¹ / ₁₆ "
Depth from Pad Ring to Rear	4 ¹ / ₄ "



ROLA COMPANY (AUST.) PTY. LTD.
THE BOULEVARD, RICHMOND, E.I. VICTORIA JB 3921
CALTEX HOUSE, KENT STREET, SYDNEY, N.S.W. BU 6147

S.W.R. Measurements with the TA-33 Jr. Triband Antenna*

C. I. PATTERSON,† VK4YP

MANY Australian Amateurs have invested in one of these beams and many more are no doubt considering doing so.

The assembly instructions specify two different element lengths, one for c.w. and the other for phone operation, so the choice is made by the owner prior to hoisting the beam into its operating position.

The c.w. position midpoint frequencies are stated to be 14150, 21150, 28500 and the phone midpoint frequencies 14250,

21350, and 29000, with a reasonably low s.w.r. over the rest of each amateur band.

The purpose of this article is to show in detail the reflected power actually measured over each of the three bands with a TA-33 Jr. assembled for both the c.w. and phone midpoint frequencies. It is hoped that a study of these results will help Amateurs to decide which of the alternative assembly instructions will be more suitable to them and to remove the nagging doubts most of us have as to whether or not we have made the correct decision when we are not in a position to prove it to be so.

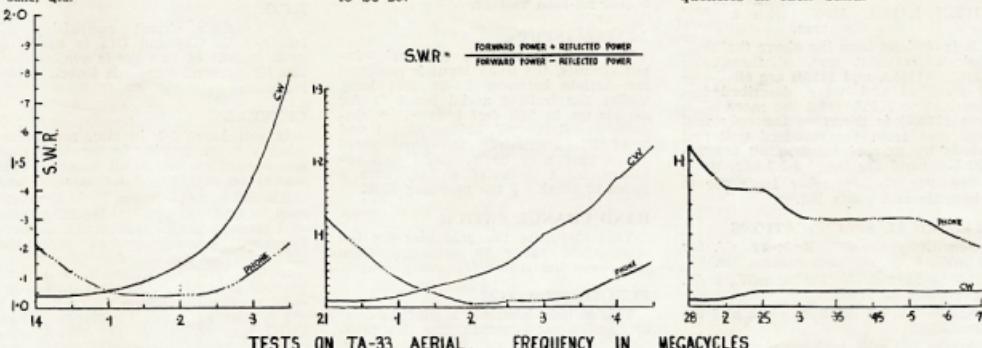
In actual fact the s.w.r. is not a matter of life and death as many of us believe, but nevertheless it is a perennial topic on the Ham bands and at least it is comforting to know that one's own co-ax line is operating according to generally accepted principles.

The measurements shown were taken at an antenna height of 45 feet. A cross check at 35 and 30 feet showed a tendency to increasing s.w.r. as the height was reduced.

A Micro Match Unit was adjusted to read 100 watts forward power in the RG-8U transmission line and the reflected power noted at various frequencies in each band.

* Copyright "A.R."

† Fig Tree Pocket Road, Fig Tree Pocket, Brisbane, Qld.



BARGAIN CRYSTALS

SATISFACTION GUARANTEED *

ANY FREQUENCY IN 3.5 AND 7 MC.
AMATEUR BANDS—38/- EACH

FT243 type holder. Frequency tolerance 0.02%

3.5 Mc. EXACT FREQUENCY—£2/10/0 each

5.5 Mc. T.V. ALIGNMENT CRYSTALS—£2/5/0 each

We can also supply Crystals on any frequency, 1,600 to 10,000 Kc.
at £2/10/0 each. Frequency tolerance 0.02%.

The above Crystals are all re-ground Disposal. They do not undergo the rigid tests of our new Crystals advertised elsewhere in this issue.
THIS OFFER ONLY HOLDS WHILE STOCKS LAST.

*

BRIGHT STAR RADIO

46 EASTGATE ST., OAKLEIGH, S.E.12, VIC. Phone 57-6387

The s.w.r. is easily determined by the formula:

$$\text{S.W.R.} = \frac{\text{F.S.M. Reading} + \text{Reflected Reading}}{\text{F.S.M. Reading} - \text{Reflected Reading}}$$

(F.S.M.: Full Scale Meter)

From the accompanying graphs, the highest reflected power reading for the "c.w." assembly is 28 watts. From the formula we have:

$$\text{S.W.R.} = \frac{100 + 28}{100 - 28}$$
$$= 128 + 72 = 1.8 \text{ to } 1.$$

Similarly, the highest reading with the "phone" assembly of 10 watts is equal to a s.w.r. of 1.2 to 1.

To summarise, it would appear that the "phone" assembly is better than the "c.w." assembly for all-band operation.

To generalise, experience has shown that the TA-33 does everything claimed by the manufacturers, including forward gain, front-to-back ratio, and s.w.r.

The RI155 Receiver—Part Two

A. G. MULCAHY,* VK2ACV

The RI155 was produced in several versions, a summary of which is given below:

Receiver Type No.	Basic Type No.	Modifications
R1155	—	Basic unit.
R1155A	R1155	R.f. interference filters added.
R1155B	R1155	Additional r.f. filtering added.
R1155C	R1155B	H.f./d.f. added for Coastal Command. Steel case.
R1155D	R1155	" "
R1155E	R1155A	" "
R1155F	R1155B	" "
R1155L	R1155B	1.5/3.3 Mc. range replaced the 75/200 Kc. range.
R1155M	R1155A	Units rejected for use in aircraft.
R1155N	R1155L	1155L with a steel case.

It is obvious from the above that four basic units exist and, of these, the RI155, R1155A and 1155B are effectively identical and were described last month. The 1155L (and the more common 1155N) is therefore the only real departure from the standard unit and this is by way of substituting the 75-200 Kc. band for the 1.5-3.3 Mc. band.

See Fig. 1 September issue for a schematic and parts list.

ELECTRICAL SPECIFICATIONS

Sensitivity (at 210 Kc.): 12 μ V. for 50 mW., 6 db. signal-to-noise ratio.

At 16 Mc.: 6 μ V. for 50 mW., 6 db. signal-to-noise ratio.

Selectivity: 4.3 Kc. bandwidth at 6 db. attenuation.

Audio: 100 mW. in 5,000 ohms, maximum.

CONVERSION

The average Amateur will have no use for the d.f. circuit (which is not described here) and a little careful snipping will produce a fair amount of spare chassis and panel space once these components have been removed. Remember that any valves removed will decrease the back bias developed across R1 and in the event that this causes distortion, R1 should be increased from 2,000 ohms to 2,500 ohms. (In some receivers R1 is 4,700 ohms.)

The following may be removed from the front panel (i.e. d.f. controls): meter balance, meter amplitude, meter deflection, aural sense, L-R switch, and the switch-speed switch.

The filter switch front panel control may be removed if desired as this switch attenuates all frequencies below 400 c.p.s. If you remove the switch, remove C10 and L29 and wire C96 permanently across C8 and C9.

POWER SUPPLY

The requirements are: 217 volts at 110 mA. for the original set. When building the power supply, ensure that

* A detailed description of this receiver together with a series of valve substitutions which will replace the original valves. The a.v.c. characteristic is worthy of study for anyone requiring an effective a.v.c. control circuit.

the negative lead is brought out as a separate terminal and is not connected to the power supply chassis. If this is not done, there will be no back bias developed across R1. Do not exceed 250 volts h.t. otherwise you will blow the condensers in the set. For this reason choke input is preferable to a condenser input filter which will have a higher no-load voltage.

AERIAL INPUT

The receiver employs two aerial input circuits, the fixed input is designed for aerials between 25-65 feet long, whilst the trailing aerial input is for aerials up to 200 feet long. If a singular aerial is used, bridge pins 1 and 2 of P1. If desired the front panel Jones plug may be removed and replaced by a co-axial socket, with a panel to blank off the resulting hole.

BAND CHANGE SWITCH

This also sets the grid bias for the appropriate range to ensure uniform gain over the entire frequency range.

FUNCTION SWITCH

This switch, labelled "Master Switch" on the circuit diagram, has five positions: Omni, a.v.c., balance, visual, figure of eight.

Omni, or communication reception on the omni-directional aerial, enables manual volume control, the a.v.c. being out of circuit.

a.v.c.: receiver gain set by the a.v.c. action, audio volume set by V8 grid potentiometer. The last three positions are for d.f. work, hence will be omitted from this description. The manual gain control varies the grid bias on V3 to V6 by means of pot. R8, which may apply any potential between -3.6v. to -30v. to V4 and V5 grids, with a lesser bias applied to V3 and V4. The maximum bias appears across R1 and is -30v.

A.V.C.

Automatic gain control of V3, V4, V5 and V6 is had in the a.v.c. position of the function switch. Under these conditions, R8 provides a.f. level control for V8. The a.v.c. delay is the potential across R4 (-3.6v.). On bands 1 and 2 this is reduced to -2.4v. by shunting R4 with R64. The voltage developed across R9, 10, 11 and 12 is divided for V3 and V6. The r.f. amplifier receives half the a.v.c. voltage, V4 and V5 full a.v.c., and V6 receives one-tenth of the a.v.c. voltage. The total a.v.c. delay is

13v. approx. achieved by holding V7 cathode positive through a voltage divider from h.t. plus. The delay is reduced on c.w.

The delay employed gives an a.v.c. characteristic which, for 80 db. signal variation, results in an output change of 8 db. The a.v.c. characteristic at 300 Kc, for a 30% modulated 400 c.p.s. signal, shows (with the filter out) a rise from -6 db. to +6 db. when the input rises from zero to 5 μ V. At 5 μ V. the knee of the curve occurs and an increase from 5 μ V. to 1.0 volt results in an increase of audio output of 8 db., i.e. from +6 db. to +14 db. (0 db. equals 10 milliwatts across 5,000 ohms). With the "filter" out, "Het. Osc." on, a 0 db. change in output occurs for a signal increase from 5 μ V. to 1.0 volt.

B.F.O.

A Colpitt's circuit comprising V7 triode, L22, C14 and C15 is used. A peak output of 42 volts is available at 280 Kc, second harmonic injection being used.

GENERAL

If you leave P2 in situ, remember, when you are groping in the dark, that pin 6 has h.t. on it all times. (This should be masked off for safety.—Ed.)

All valves employed in these receivers may be replaced by octal types. (These will cause a slight degradation in performance when compared with the original valves, which were of a "beam tetrode" type construction, but will provide a highly satisfactory substitute.—Ed.)

For the r.f. and i.f. stages, EF39, 6U7G and 6K7 types are direct substitutes, whilst the 6J8G, 6K8G and ECH33 are suitable for the converter.

Remember to remove h.t. from all pin 1's on the valve sockets before using metallised tubes, otherwise the outer shell will be at h.t. plus.

The b.f.o. and audio stages may be replaced with a 6B6G.

If you add a higher powered audio output stage, e.g. a 6VG6, return the grid and cathode resistors to the h.t. negative line, and not to earth. By so doing, this will avoid the rise in back bias which would result if the 6VG6 current had to flow through R1.

★

WORLD AMATEUR POPULATIONS

The United States of America has 201,002 Amateurs calling CQ, which are answered by Great Britain's 9,400, with Brazil (7,200) and Argentina (7,199) very close together but less than Canada (7,900), Germany (6,900) leads the field after the big five, and is then followed by Japan (6,400), Australia (4,000), New Zealand (2,900), South Africa (2,889), Sweden (2,200) and France with 2,100. Only five other countries have one thousand Amateurs, and one hundred and nineteen countries have less than one hundred Amateurs.

* 45 Louis Street, Padstow, N.S.W.

A 6146 on 2 Metres*

THERE is a problem facing the newcomer to the 2 metre band, namely the obtaining of a suitable final. One is faced with finding a tube which is capable of running reasonable power and which will operate with a minimum of trouble.

My thoughts are centred on a valve type in the QQ series. While realising that these were ideal, I felt they were beyond my pocket. Hence it was decided to compromise in that I would build a transmitter in which a QQE06/40 could be substituted at some future date. Having a spare 6146 (which can be obtained at a reasonable price) and borrowing ideas from here and there, the following transmitter was constructed.

The exciter follows quite normal construction. It consists of a 12AU7, both triodes common as a third overtone oscillator. The slug-tuned coil is from a SCR522 and has 28 gauge wire wound to just cover the well.

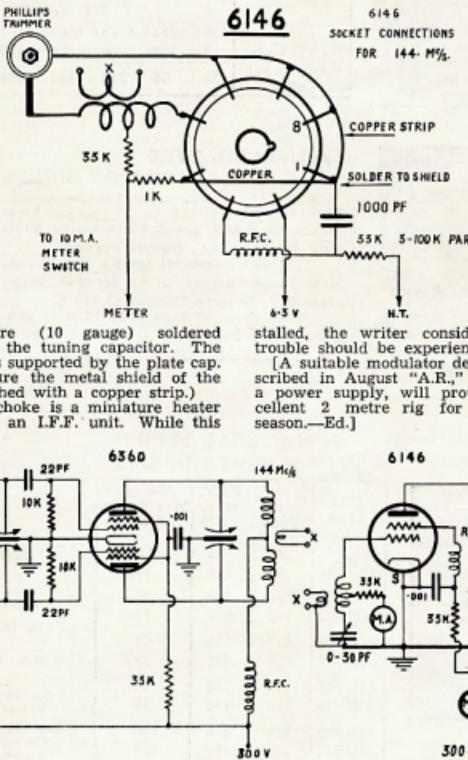
The 5763 valve is used as a doubler and drives a 6360 operating as a push-pull tripler to 144 Mc.

This appears to be an excellent valve in this application and is capable of driving a 6/40 to its full output. Care was taken to keep all leads very short. The doubler plate coil and capacitor, and the plate coil, etc., of the tripler, were mounted on opposite sides of the 6360 socket. Controls to the variable

on a 1 watt I.R.C. resistor. Careful attention was paid to wiring the socket which was a normal spring-mounted octal. A strip of copper was run round all the earth pins and soldered to a common point alongside the socket. The grid resistor and Philips' air trimmer were all soldered to this strip. The plate coil consists of 4 turns of heavy

may not be ideal, it would be easy to wind a few turns of fine wire on an I.R.C. resistor.

A 3-turn aerial link was used and coupled in till the plate current was about 100 mA. As this amplifier depends on grid drive for bias, care must be taken to ensure the exciter is operating. With plate and grid meters in-

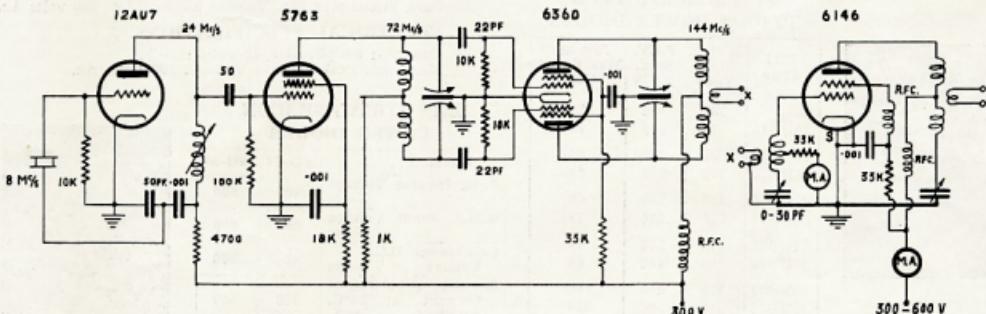


copper wire (10 gauge) soldered directly to the tuning capacitor. The other end is supported by the plate cap. (Make sure the metal shield of the 6146 is earthed with a copper strip.)

The r.f. choke is a miniature heater choke from an L.F.F. unit. While this

stalled, the writer considers that no trouble should be experienced.

[A suitable modulator design was described in August "A.R." which, with a power supply, will provide an excellent 2 metre rig for the coming season.—Ed.]



capacitors can be brought out to the front panel if desired. Values of variable capacitors and coils are not given as any small butterfly condenser will do and the coil adjusted to resonate at the desired frequency with a g.d. meter.

The final, in my case a 6146, was mounted horizontally on a shield above the exciter chassis. A tuned grid coil was used and a closely coupled two-turn link fed energy from the exciter. The grid current was set at 3 mA. by varying the coupling.

Neutralising was carried out with a coil, in the screen lead, consisting of 28 turns of 29 gauge copper wire wound

* Written by an anonymous avid "A.R." Reader.

CHOOSE THE BEST - IT COSTS NO MORE



The WARBURTON FRANKI Page

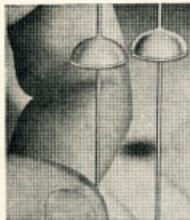


DIFFUSED JUNCTION SILICON DIODES



6F SERIES						
P.I.V. (Volts)	6F5	6F10	6F15	6F20	6F30	6F40
R.M.S. Input (Volts)	50	100	150	200	300	400
	500					
12F SERIES						
P.I.V. (Volts)	12F5	12F10	12F15	12F20	12F30	12F40
R.M.S. Input (Volts)	50	100	150	200	300	400
	500					

COMMERCIAL TYPE SILICON DIODES



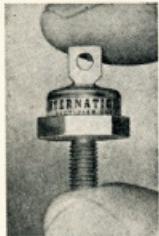
Peak Inverse Voltage	Volts
Maximum R.M.S. Input Voltage	Volts
Max. Rectified D.C. Output Current (at 70°C. ambient temp.)	m.A.
Max. Surge Current (at 0.1 second)	Amps.
Max. D.C. Reverse Current at 100°C. (full cycle average over 10 sec.)	m.A.
Max. D.C. Voltage Drop at 500 mA.	Volts
200 mA.	Volts

2E4		5E4	
Cap. Load	Res. Load	Cap. Load	Res. Load
400	400	400	400
140	280	140	280
200	300	350	500
2	2	5	5
0.5	0.5	0.5	0.5
—	—	1.3	1.3
1.3	1.3	—	—

SEMICAP



COMMERCIAL TYPE SILICON POWER DIODES



Int'l Type	R.M.S. Max. Volts	P.I.V. Max. Volts	Recom'd Max.R.M.S. Volts
25HB5	35	50	12
25HB10	70	100	24
25HB15	105	150	36
25HB20	140	200	48
25HB25	175	250	60
25HB30	210	300	72
25HB35	245	350	84
25HB40	280	400	96
25HB45	310	450	108
25HB50	350	500	120

★ WRITE OR PHONE FOR COMPLETE DETAILS ON ANY OF THE ABOVE

TYPICAL CHARACTERISTICS:

Capacitance Range: 3 to 30 pF.

Frequency Range: 1 to 500 megacycles.

Peak Signal plus Bias Voltage Range: 0.1 to 200 volts d.c.

ELECTRICAL SPECIFICATIONS:

Capacity: 6.8 pF. at -10 volts ±20%.

Maximum Peak Inverse Voltage: 200 volts d.c.

INDUSTRIAL SILICON POWER DIODES

Diode Types	SD-94	SD-95
Peak Inverse Voltage Volts	400	500
R.M.S. Input Voltage Volts	280	350
Continuous D.C. Voltage Volts	400	500
Rectified D.C. Output Current, at 50°C. Ambient m.A.	550	550
Ditto, at 100°C. Ambient m.A.	300	300
Max. Surge Current (1 cycle) Amps.	10	10
Max. Operating Frequency Kc.	50	50



WARBURTON FRANKI

VIC.—359 LONSDALE ST., MELB., 67-8351
QLD.—233 ELIZABETH ST., BRIS., 31-2081

- N.S.W.—307 KENT ST., SYDNEY — BX 1111
- S.A.—204 FLINDERS ST., ADELAIDE—W 1711

ALL KITS ABOVE
AVAILABLE
FROM STOCK

A 500V. 300 mA. Supply using Silicon Rectifiers

S. T. CLARK,* VK3ASC

AT the time of my original experiments I only had eight 1N1763's available and had to limit the a.c. input to the bridge rectifier to 540 volts r.m.s. (the absolute maximum quoted by the manufacturers).

The overall efficiency worked out at 84%, a figure which is greatly in excess of that obtainable with selenium or thermionic rectifiers.

CONSTRUCTION

The power supply can be built on a chassis measuring 13 $\frac{1}{2}$ " x 4 $\frac{1}{2}$ " and at least two inches deep, or on the rear of a larger chassis which will accommodate the transmitter and modulator. [If the specified parts are used.—Ed.]

Mount the iron cored components as shown in Fig. 1, with the rectifiers on a tag strip of twenty-four lug beneath CH1 and the electrolytics used for C2 and C3 on another tag strip beneath CH2. The bleeder can be mounted on the rear apron with the switches and pilot lights on the front. If a separate chassis is used a power connector will also be needed on the rear apron. This can be one of the several types available.

Of course, if you build the supply as part of a Table Topper, as is my intention, then the switches and pilots will be mounted on the front panel and the supply wired directly to the transmitter.

Be sure to observe the proper polarity of the rectifiers and electrolytics. The rectifiers are connected as shown diagrammatically in Fig. 1. They have a small symbol marked on them indicating the polarity.

In a power supply using a choke input filter, the unloaded d.c. voltage rises to the peak value of 1.42 times the r.m.s. input (i.e. 820 volts). By choosing the correct values for L1 and R1, this voltage can be controlled. In this case the d.c. output voltage is 570 volts with 30 mA. through the bleeder or 550 volts with 50 mA. The knee of the curve is quite sharp and the voltage drop is almost perfectly linear from the 50 mA. load point through to the "overload" check point of 400 mA., where the output voltage is still 460 volts.

The value of the bleeder resistor must be adjusted to take between 30 and 50 mA. unless it can be arranged that some of the low power stages which are not keyed or modulated are used as "bleeder". In this case then the resistors used for R1 could be very much higher in value than the 18,000 ohms for 30 mA., or 11,000 ohms for 50 mA. Four 100K ohm 2 watt resistors should be adequate for discharging the filter capacitors. The four resistors should be connected in series-parallel making a 100K ohm bleeder.

Taking the minimum tolerable bleeder current of 30 mA. as our "no load" condition, then the regulation figures are 6.6% for 70 mA. (100-30), 11.75% for 170 mA. (200-30), and 17.5% for 270 mA. (300-30). If the

idling current is adjusted to 50 mA. or more, then the regulation figures will be slightly improved because the internal resistance of the supply is a constant 300 ohms after passing the 50 mA. load point.

Regulation could be further improved by only using one choke in the filter for the high power stages, however, it may then be necessary to increase the capacity of C2 above the 20 μ F. used.

The condensers need only have a combined peak rating of 700 volts when the bleeder is adequate and suitable units of 50 and 100 μ F. are available. If the larger units are used, be very careful to use adequate insulation on the cans.

POWER SWITCHING

Two double pole switches are shown, with one pole of S1 and S2 connected in parallel in the transformer primary, and the other poles connected in series in the h.t. output lead. This arrangement means that either switch may be used to switch the h.t. on and off and both switches must be off before the heater supply is disconnected.

The switches used should be robust with long leakage paths. I suggest Bulgin 4 amp. type or similar. Ordinary toggle switches are not recommended as they are too liable to fail and 5 amp. a.c. light switches are not designed for this service.

A suitable alternative would be to use a Bulgin type on the a.c. side and a "microswitch" on the h.t. This switching arrangement permits using the filament windings to supply the

tube heaters and 6-7 amps. can be drawn from these windings so long as the total h.t. drain is limited to 300 mA.

PILOT LAMPS

These are 240V. $\frac{1}{2}$ watt neons but a smaller size may be substituted if desired. The h.t. indicator (red) will need an additional dropping resistor R2, of about $\frac{1}{2}$ megohm to limit the current to a safe value.

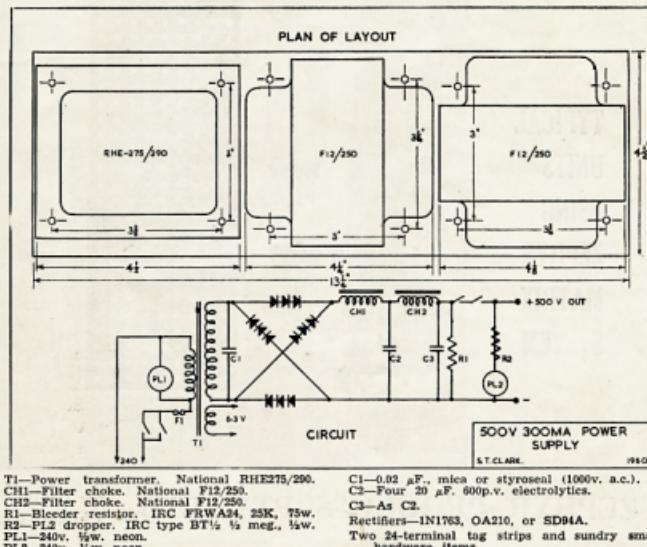
PROTECTION

The circuit diagram of Fig. 1 shows only a 2 amp. fuse F1. The rectifier manufacturers warn against the likelihood of damage to silicon rectifiers from switching and keying transients. They state that these may be absorbed by capacitors, but I have been unable to obtain any recommended values as the only information I have suggests c.r.o. measurements to permit adjustment. C1 is included across the transformer secondary to help suppress transients. CH1 and 2 could be similarly treated also.

There appear to be a number of methods which are used in power supplies of this type, but there is no unanimity about the most effective methods and readers would do well to consider any technique which will protect a batch of silicon rectifiers from being damaged by transients.

BIBLIOGRAPHY

1. Radiotron Designer's Handbook.
2. Radiotronics, June and September, 1969.
3. "Mininewt" Germanium and Silicon Transistors and Diodes. Fifth Edition.
4. A.R.R.L. Handbook.
5. Radio Handbook.



T1—Power transformer, National RHE275/290.
CH1—Filter choke, National F12/250.
CH2—Filter choke, National F12/250.
R1—Bleeder resistor, IRC FRA24, 25K, 75W.
R2—PL2 dropper, IRC type BT1 $\frac{1}{2}$ meg., 1/2W.
PL1—240V. 1/2W. neon.
PL2—240V. 1/2W. neon.

C1—0.02 μ F, mica or styrofoam (1000V. a.c.).
C2—Four 20 μ F, 600V.p. electrolytics.
C3—As C2.
Rectifiers—1N1763, OA210, or SD94A.
Two 24-terminal tag strips and sundry small hardware items.

JAMBOREE-ON-THE-AIR

The Scout Jamboree-on-the-Air will be held from 1000 hours on 22nd October, to 1000 hours (E.A.S.T.), on 24th October, 1960. The following Victorian stations are taking part:

VK3 3ADD Hamilton, 3ADV Skipton, 3WB Penshurst, 3II and 3AGD Dunkeld, keld, 3AKR Westmere, 3ABT Geelong, 3HG Coleraine, 3MC Coleraine, 3AKN Macarthur, 3ARJ Allansford, 3ADN Lismore, 3XN Hawksdale, 3JA Nullawarre, 3APS Casterton and 3XE Wools-thorpe.

The State Co-ordinator for this job is John 3AGD and his assistant is Lin 3ARL. John's address is "Wandobah," Dunkeld, telephone 134; and Lin's, 53 Alwyn St., Mitcham, telephone WU 3422.

Have you thought about a little display of your equipment for the visitors? Or to making up some simple little device, remembering perhaps that proximity sensor?



PEDAL WIRELESS PIONEER PASSES ON

On 26th July there was a hush over the Centre as all transceivers and bases of the Flying Doctor network went off the air for two minutes in quiet tribute to Mr. M. B. (Morrie) Anderson (VK3AMA, ex-VK5MA) who died in the Heidelberg Hospital, Melbourne, on 22nd July.

Morrie Anderson, pioneer in his own right, was known up and down the

tracks from Burketown to Birdsville, from Innamincka to Broken Hill, from Camooweal to Millingimbi, and from Alice Springs to Coober Pedy. His friendly drawl from the Cloncurry and Alice Springs bases giving patient instruction to bush mothers struggling with a pedal set will never be forgotten.

"Morrie Anderson," said a cattleman, "symbolised the practical comradeship which has always been part of Flynn's team of workers. The whole inland is in mourning today for a great man."

His name is commemorated on a tablet in the Pioneers' Memorial Wall at the John Flynn Memorial Church at Alice Springs.

—"A.I.M." Frontier News, August 1960.



DAFFY DEFINITIONS

A.M.—An old fashioned system of adding and subtracting intelligence (?) to and from a carrier which really isn't needed in the first place.

S.S.B.—An expensive method of getting all a.m. operators mad.

D.S.B.—A less expensive method of getting all a.m. and s.s.b. operators twice as mad.

C.W.—A still less expensive method of getting yourself mad.

(Courtesy Raga Review, Radio Amateurs of Greater Syracuse.)

Psycho schematic; a radio amateur following P.M.G. trunk line circuits.

LONG DISTANCE COMMUNICATION

The American space probe, "Pioneer V", designed to orbit between the sun and earth, a distance of fifty million miles, relies upon solar cells to power its instruments.

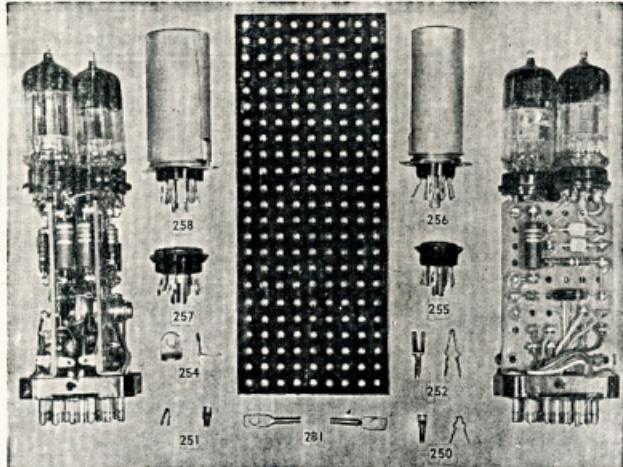
Jodrell Bank (England's giant radio astronomy centre) was in control, being one of the few centres in the world capable of receiving messages from such a distance. Frequencies of 373 Mc. and approximately 960 Mc. being used for control. It would appear that "Pioneer V" is now inoperative as radio messages are no longer being received from it. However, the space vehicle is itself still in orbit.



"Working Mobile."

REDUCE THE SIZE AND COST OF YOUR NEW EQUIPMENT

TYPICAL UNITS USING ZEPHYR MATRIX SYSTEM



Leaflets and
Price List available
from all
leading Wholesalers.



Enquiries invited
from
Manufacturers.

ZEPHYR PRODUCTS PTY. LTD.

58 HIGH STREET, GLEN IRIS, S.E.6, VIC.
Phones: BL 1300, BL 4556

TRANSISTORISED CONVERTER FOR MOBILE WORK—THE EASY WAY

(Continued from Page 9)

use of dry cells is that it is unnecessary to make any power supply connections, either to the car receiver or to the car battery. This saves considerable time during installation and makes the unit readily adaptable to portable operation should the occasion arise.

The chassis used by the author was made from brass from an old AR7 coil box, which with very little effort can be made to look neat and tidy. Figs. 2 and 3 give an idea of the layout. No particular layout is required. No instability was experienced as a result of lead and component placement. Keep all leads as short as possible and mount all the parts securely to the chassis. This will prevent the leads from breaking as a result of the vibration which occurs in mobile operation.

Because of the small current and voltage requirements of the converter, it is not necessary to use standard hook-up wire in the circuit. No. 30 insulated wire is entirely adequate and results in a much more compact and neat-appearing finished product.

Only two external connections to the converter are necessary. A co-ax lead from the antenna must go to the input of the unit and an output co-ax connection to the input of the car radio is required.

When the unit is wired and ready for testing it will first be necessary to make certain that the oscillator is functioning. An easy method of determining this is to turn the converter on and listen to the home receiver for the signal from the oscillator. Tune the receiver to the oscillator crystal frequency and adjust the slug in L3 until the signal is heard. The oscillator will not oscillate until the collector tank C2-L3 is resonant. If the converter was built for operation on 20, 15 or 10 metres, it will be necessary to tune the home receiver to the third

harmonic of the crystal frequency while making the above adjustments.

After the oscillator is known to be operating properly, install the unit in the car with the car radio tuned to the intermediate frequency of the converter and the converter turned on, adjust the slug in L3 for maximum background noise as heard on the car receiver. Next adjust the slug in L1 for maximum noise or select a weak signal and peak it up for maximum gain. After this adjustment is completed set the car radio for the centre of the i.f. frequency band to be used with the converter, adjust the slug in L5 for maximum gain. If only one segment of a particular band is going to be used additional gain can be realised by peaking the coils for that portion of the band. Example, peak the converter for 3,800 to 4,000 Kc, rather than 3,500 to 4,000 Kc, if 75 metre operation is contemplated and you are interested primarily in the phone band.

The converter built by the author has been in constant service for two years and the four penlite cells have only been replaced once in that time. Under normal circumstances they should last their normal shelf life. The measured current drain of the converter was 2.3 mA.

The sensitivity of the unit on the lower frequencies is comparable with that of a three-tube converter which was originally used in the writer's mobile installation. It does not compare as favourably with a vacuum-tube converter when used on 15 or 10 metres because no r.f. amplifier stage is incorporated. However, it proves to be adequate and an S6 signal or better is comfortable copy at these frequencies.

Changing to a transistorised converter was one of the most gratifying experiments I have undertaken and was well worth the effort. I am sure you will find the results equally satisfactory.

REFERENCES

- Philips Transistor Circuitry, 1959.
"QST," September 1958, 1959.
Philips Transistor Circuitry, 1959.

FEEDBACK

There are some who regrettably consider that s.w.l.'s. are a pest and should not be encouraged. This is an unfair attitude because many Amateurs are s.w.l.'s. and it cannot be claimed that the same person is different when he calls CQ to whom he signs an s.w.l. card. (Look through the Call Book and see how many Amateurs are s.w.l.'s.—you will also be surprised.) Today our aim should be an active W.I.A. and for this to continue we must have new members, and what better source of potential Amateurs than the current s.w.l. Everyone must commence in a hobby and it is very important we encourage people to join our ranks. Perhaps you have forgotten how you received a start in Amateur Radio, but did your tutor consider you a pest, because if he did, then would you have continued with your interest and become an Amateur? It is deplorable for any group to become split in its opinion regarding the desirability of having certain classes of interest within its ranks. Let every member welcome newcomers to our hobby, and endeavour to have them obtain their ticket, then we can be assured of the continuation of the W.I.A.



Hope all this moon-bounce publicity is not moon-shine.



If Amateurs decided to assist the Country Fire Authority in every way possible they would be rendering a valuable community service, and by so doing may perhaps overcome the prejudice in some quarters regarding the desirability of a W.I.C.E.N. network. It is admitted that we already do help the C.F.A., but are we doing all we can? I know of one group who have realised that their local community "service" (?) is incapable of being used in a real emergency. It would be useless for the local authority to find out in an emergency that his stand-by network could not be used, and these Amateurs are to be congratulated in going ahead without waiting for officialdom to learn that their thoughts are not worth a 69 Ge/s. dipole. This is something to think about—could the Amateur Service obtain much needed emergency network practice, help an essential community service, and at the same time prove (if proof was needed) that Amateurs are professionals, all by increasing their C.F.A. activity?



Public Relations — Populated Bands
— Progress — Publicity —



I wonder if the readers of "A.R." would reply to a questionnaire and state what they prefer to read in the magazine. This could help the Publications Committee (and make more work for the Editor.—Ed.), but perhaps they had not thought of it. Why not write in and say what you prefer. It could save me having to write this column each month.

73,
CASEY.

CHIEF ENGINEER ELECTRICAL DESIGN AND MANUFACTURE

SALARY TO £3,000

This position with a soundly established organisation undergoing a rapid expansion programme, offers an excellent opportunity and prospects for an outstanding electrical engineer.

The successful applicant will be responsible to the Managing Director for all engineering activities associated with the design and manufacture of electronic equipment.

QUALIFICATIONS. Applicants should possess the following:

- ★ Recognised academic qualifications in Electrical Engineering.
- ★ Extensive experience in the design of electronic equipment.
- ★ Sound management ability for the effective administration of a growing division and participation as a member of the top management team.

The position is located in Melbourne.

Applications in confidence to:
"ENGINEER."

CHANDLER & MACLEOD PTY. LTD.,
Personnel and Training Consultants,
445 St. Kilda Road, Melbourne.

26-3619

TECH
VACUUM TUBE VOLTMETER
Model PV-58

Designed to read DC, AC, Zero-Centre, RF and HV.
 AC-DC Voltages ranges: 0-1.5, 5, 15, 50, 150,
 500 and 1,500 volts.

Type HV-20 High Voltage Probe with built-in multipliers extend AC scale by factor of 20 giving full scale readings of 0-30, 100, 300, 1,000, 3,000, 10,000 and 30,000 volts. Decibel scale available for level observations based on 1mW into a 600 ohm line as zero db, corresponding to 0.774 volt AC on 1.5 ohm range. AC to db conversion chart supplied with each instrument as part of instruction booklet.

TECH Model PV-58 V.T.V.M.

£19/10/0 plus 12½% Sales Tax

Accessories:

RF-22 HIGH FREQUENCY PROBE

46/6 plus 12½% Sales Tax

HV-20 HIGH VOLTAGE PROBE

63/- plus 12½% Sales Tax



**For Accurate Matching
and Maximum Efficiency**

WODEN
MODULATION
TRANSFORMERS

List No.	Audio Watts	Max. Sec. Current	Overall Size	Weight lb. oz.	Price inc. S.T. Plus Freight
UM1	30	60	120 mA.	3 7/8" x 3 1/4" x 3 5/8"	5 8 £7/9/9
UM2	60	120	200 mA.	5 1/4" x 4 1/4" x 5 1/4"	11 8 £10/13/3
UM3	120	240	250 mA.	5 1/4" x 5 1/4" x 5 1/4"	14 8 £12/2/6
UM4	250	500	400 mA.	10 1/4" x 6 3/4" x 8 1/4"	41 0 on application

**TMK Model MG-310
MULTITESTER**

Sensitivity 20,000 ohm/V. DC
10,000 ohm/V. AC
Ranges:

0-5, 25, 100, 500, 1,000 volts AC.

0-5, 100, 500, 1,000 ohms AC.

DC Current 0-1 milliampere: 0-5, 50, 500 m.A.

Resistance 0-60K, 600K, 0-6M... 60M ohms.

Decibels: Minus 20 to plus 16 db., plus 30 db.

£9/0/0 plus 12½% Sales Tax

**TECH POCKET VOLT-OHM
METER, Model PT-34**

Sensitivity 1,000 ohm/V. using
300 microamp. meter.

Ranges:

0-10, 50, 250, 500 and 1,000 volts AC/DC.

0-1 mA., 100 mA. and 500 mA.

0-100K and Infinity ohms.

44/- plus 12½% Sales Tax

**Pi-COUPLER FOR
HIGHER POWER**

Compact, handswitched, high power pi-coupler inductor for co-ax output. Rated for max. 1.200W. I.C. 1-2 MHz. Input. High voltage on A.C. and S.S.B.

For maximum efficiency the 10-metre coil is made of 1/8 in. silver-plated strip, 15 and 20-metre coils of 1/8 in. silver-plated wire, and the 40 and 80-metre coils of 12 B. & S. E. thin-wire copper.

Input capacity 250 pF max., output capacity 1,500 pF max. A single pole five-position switch is provided which can be used for switching in parallel capacities used as required.

Recommended input capacitor: Eddystone Type 817. Recommended output capacitor: Standard miniature 3-gang CA condenser which is suitable in this position up to 1 kw.

Price: £4/17/6 nett

"Willis" Med. Power Pi-Coupler.
£3/19/6 inc. Sales Tax.

Geloso Pi-Coupler, 35/6 inc. S. Tax.

"Willis" Heavy Duty Pi-Coupler Choke, 25/- inc. S. Tax.

S P E C I A L S					
AMERICAN TUNG SOL 6AG7's	.....	.....	.....	.....	30/- ea.
RADIOTRON AV11 RECTIFIERS	.....	.....	.....	.....	10/- ea.
AMERICAN R.C.A. 813's	.....	.....	.....	.....	£3/10/0 ea.
" R.C.A. 6293's	.....	.....	.....	.....	£4/10/0 ea.
" G.E. 6BJ7's	.....	.....	.....	.....	£2/10/0 ea.
" R.C.A. 6146's	.....	.....	.....	.....	£3/15/0 ea.

GELOSO
MODEL G222-TR
TRANSMITTER



- SIX BANDS
- BAND SWITCHED
- PHONE-C.W. OPERATION
- SELF CONTAINED WITH POWER SUPPLIES AND MODULATOR

Frequency	10 metre band—28.0 -29.7 Mc.	20 metre band—14.0-14.6 Mc.
Coverage:	11 metre band—26.96-28.0 Mc.	40 metre band—7.0- 7.3 Mc.
	15 metre band—21.0 -21.9 Mc.	80 metre band—3.5- 4.0 Mc.

Tube Line-up—V.F.O.: 6CL6 and 5763. P.A.: 6146. Mod.: 12AX7, 12AU7, two 807s.
£125/10/0 inc. Sales Tax

WILLIAM WILLIS & CO. PTY.

THE HOUSE OF QUALITY PRODUCTS

428 Bourke Street, Melbourne, C.I. Vic.

MU 2426

Rules of the Australian DX Century Club Award

1. The Australian DX Century Club Award is open to any Australian Amateur who has established two-way contact with one hundred or more countries in the world and complies with the following Rules.

2. All contacts must have been made since the return of licensee after the 1939-45 War.

3. The official Countries List, as published annually and amended from time to time in the Federal Notes of "Amateur Radio" shall be used for the purpose of determining "countries".

4. All contacts shall be made with other Amateur stations operating in the authorised Amateur bands, or with stations licensed to contact Amateur stations.

5. Contacts made with ship or aircraft stations will not be allowed, but land mobile stations may be claimed provided the location at the time of contact is clearly shown on the confirmation.

6. Credit may only be claimed for stations using regular government assigned calls for the country concerned.

7. Stations of a portable nature which are using their own call sign followed by the prefix of the country in which they are operating may be credited under Rule 6 above, provided that the confirmation submitted indicates the particulars of such operation and the other requirements are in accordance with these Rules.

8. Each confirmation submitted must show the date of contact, type of emission, the report, the band and the location of the station.

9. Confirmations must be submitted exactly as received from the station contacted and altered or forged confirmations will be grounds for disqualification.

10. Out-of-band operation used to contact a station will result in disqualification and be retrospective in the case of members.

11. All stations must be contacted from the same Australian call area and by the same licensee, although if the call sign is subsequently changed, contacts will be allowed if still within original call area and by the original licensee.

12. Confirmations submitted which show both phone and c.w. reports may be accepted for both sections if the date of each contact is shown and emission is indicated.

13. Should a country be deleted from the official countries list at any time, members and intending applicants will be credited with such country if the date of contact is before the date of such deletion.

14. Certificates will be issued for "All Phone", "All C.w." and "Open" contacts with a hundred countries and stickers will be subsequently issued for each additional twenty countries confirmed over the one hundred.

15. Successful applicants will be listed monthly in "Amateur Radio". Subsequent to the first application,

members must submit additional confirmations of not less than five at any one time, for additional credit.

16. Applications for membership shall be addressed to the Awards Manager, G.P.O. Box 2611W, Melbourne, and accompanied by sufficient postage for return of confirmations to the applicant, registration being included if desired. Confirmations must also be accompanied by a list of claimed countries and stations, showing relevant details or explanations where necessary.

17. The decision of the Awards Manager in the interpretation and application of these Rules shall be final and binding.

18. Notwithstanding anything to the contrary in these Rules, Federal Council of the Wireless Institute of Australia reserves the right to vary or alter them when necessary.

D.X.C.C. AWARDS AS AT 1/9/60

PHONE

Call	Cer. C'nt- No. ries	Call	Cer. C'nt- No. ries
VK6RU	2 247	VK3TE	37 115
VK6MK	43 241	VK4JP	8 114
VK5AB	45 232	VK7TLZ	36 111
VK4FJ	21 219	VK5HW	38 111
VK3WL	14 211	VK5MS	24 109
VK3ATN	26 204	VK4CB	28 109
VK6KW	4 199	VK3WM	29 109
VK4HR	12 192	VK4EL	44 108
VK3BZ	3 176	VK7TRX	32 107
VK4RW	23 164	VK4NC	35 105
VK3EE	10 163	VK9AU	40 104
VK9DB	31 161	VK3HO	25 103
VK4WF	16 160	VK2VV	46 103
VK3JD	1 155	VK2ADT	13 102
VK4KS	9 152	VK2AHA	15 102
VK3LN	11 141	VK6GP	19 101
VK3JE	7 140	VK5CE	34 101
VK4DO	20 139	VK3TG	48 101
VK6DD	6 126	VK3IG	5 100
VK5XN	42 126	VK3GG	18 100
VK4RT	22 124	VK5LC	27 100
VK4WJ	17 122	VK3AUP	30 100
VK3ACN	39 120	VK3VQ	33 100
VK2AHH	41 120	VK2AJO	47 100

C.W.

Call	Cer. C'nt- No. ries	Call	Cer. C'nt- No. ries
VK3KB	10 280	VK3XO	43 144
VK3CX	26 267	VK5JT	54 144
VK4FJ	29 262	VK3VW	4 143
VK3NC	19 236	VK2QL	5 143
VK3FH	15 226	VK4SD	52 140
VK3BZ	6 222	VK3XK	30 138
VK4HR	8 218	VK3DQ	61 135
VK3XU	48 213	VK3ZO	65 136
VK6RU	18 209	VK5FN	31 134
VK3YL	39 203	VK3JI	25 131
VK5BY	45 202	VK2XU	64 129
VK2EO	2 191	VK3JR	42 128
VK5RX	23 190	VK3RP	56 126
VK4DO	20 176	VK4RF	11 125
VK4EL	9 175	VK3HT	37 124
VK5BO	33 171	VK3YD	27 123
VK3CN	1 163	VK3EK	3 122
VK7LZ	17 162	VK3UM	12 120
VK4RW	47 155	VK3PL	38 117
VK9XK	41 154	VK2OY	44 115
VK2GW	16 151	VK7LJ	24 114
VK6SA	28 159	VK6GW	40 114
VK3JE	21 148	VK4DA	7 113
VK4QL	36 146	VK2OI	49 108

C.W. (Continued)

Call	Cer. C'nt- No. ries	Call	Cer. C'nt- No. ries
VK5KU	63 108	VK4SS	53 103
VK4RC	13 107	VK3PG	46 102
VK2AHH	62 107	VK2AIR	60 102
VK2AEZ	35 105	VK2OA	32 101
VK7CH	55 105	VK3APA	14 101
VK3ARV	59 105	VK3ZA	57 101
VK3AHH	51 104	VK2OW	58 101
VK3ARX	66 104	VK7RK	22 100
VK5BS	67 104	VK3AHM	50 100
VK2YC	34 103		

OPEN

Call	Cer. C'nt- No. ries	Call	Cer. C'nt- No. ries
VK2ACX	6 232	VK3VQ	46 127
VK4FJ	32 265	VK2AHH	20 125
VK6RU	8 263	VK3PG	47 124
VK6MK	74 245	VK3YS	57 121
VK3NC	7 238	VK3AHO	76 119
VK4HR	7 233	VK5LC	55 118
VK3EZ	4 231	VK4CC	62 117
VK3HG	3 225	VK3HL	75 117
VK3WL	45 225	VK2ASW	53 116
VK3XU	61 221	VK5NO	78 116
VK6KW	13 214	VK6GP	44 115
VK3JE	12 210	VK3JA	43 114
VK3ATN	69 210	VK2ADT	14 113
VK7LZ	23 201	VK7TRX	60 112
VK4DO	15 196	VK3HO	38 111
VK2NS	16 195	VK3MM	49 111
VK4RW	52 191	VK4RC	21 110
VK9DB	59 182	VK3ZB	34 110
VK4EL	10 175	VK2ZC	25 108
VK2DI	12 170	VK3KMR	56 107
VK3KX	1 167	VK3AHH	64 107
VK4WF	40 165	VK2YL	11 106
VK9XX	54 156	VK3AWN	36 105
VK3DQ	71 152	VK6WT	58 105
VK2AHH	73 151	VK2VN	18 101
VK5JT	63 150	VK4UL	27 104
VK9GW	48 148	VK6PW	50 104
VK2XU	79 146	VK3ATR	72 104
VK3LN	29 144	VK2HZ	17 103
VK5FL	26 143	VK7KB	30 103
VK3HT	41 141	VK2TI	37 103
VK3MC	5 139	VK3ZA	65 103
VK3OP	19 137	VK7RK	31 102
VK6DX	42 137	VK4TY	35 102
VK6DD	22 136	VK2AFA	70 102
VK2ADE	28 133	VK5KI	51 101
VK3JI	33 131	VK2TG	39 100
VK4BG	66 130	VK1EG	67 100
VK2AHA	9 128		

The political framework of the world is constantly subject to change and in this regard 1960 will always be remembered. A brief examination of the Countries List in use a few years ago reveals how unrealistic it would appear if still in use today. It has been suggested that political considerations be removed from our thinking and instead we settle for some form of geometrical division of the earth's surface into zones. "W.A.Z." sponsored by "CQ" magazine provides 40 Zones following country boundaries in part otherwise across stretches of ocean and not conforming to any particular size or pattern. There is no particular merit in any such sub-division as far as countries are concerned. Another proposal has been to divide the map draught-board fashion but DX'ers (and

Award Managers) would be faced with the impracticable task of plotting DX contacts.

The above infers that listings are influenced by the form of Government of the place concerned. Irrespective of its size, location or population, consideration is given to the listing of any place from which there is or has been Amateur activity and geography is, therefore, the second criterion.

Briefly, the main considerations for separate listing as a "country" are:

1. Political-administrative independence, and/or
2. Geographical separation (225 miles by water, excepting natural island groupings or 75 miles by land).

The list has been compiled on these lines, for the most part; however, the

main requirement is that we have a common list, interesting and informative in itself, for all comers to follow.

A new and attractive Australian DXCC Certificate is being prepared by F.E. and all DX'ers are urged to work for and obtain this Award plus stickers for every additional 20 confirmations credited.

Details of countries which have been deleted from the current list from time to time, for which credit may still be obtained vide Rule 13, and all other relevant information will be embodied in future W.I.A. Countries Lists. The first complete list will be published in January, 1961, issue of "A.R." •

A. KISSICK, VK3JB,
Award Manager,
1 Macfarland St., Brunswick, Vic.

CONTESTS

VK/ZL DX CONTEST

The Federal Contest Committee of the Wireless Institute of Australia appeals to all VK Amateurs to make an extra BIG effort to enter enthusiastically in the VK/ZL DX Contest during the first two week-ends in October.

Among the logs received on last year's Contest were a number of complaints on the conspicuous absence of VK stations to be heard. One remarked that he didn't hear any VK1 stations, and promised a real pile-up of answers to any who called.

"CQ" WORLD WIDE DX CONTEST

The phone section of this Contest commences at 0200GMT on October 29 and run to 0200 GMT on October 31.

The c.w. section starts at 0200 GMT on November 26 and concludes at 0200 GMT on November 28.

Low Drift Crystals FOR AMATEUR BANDS

ACCURACY 0.02% OF
STATED FREQUENCY

3.5 Mc. and 7 Mc.

Unmounted £2 10 0
Mounted £3 0 0

12.5 and 14 Mc. Fundamental
Crystals, "Low Drift,"
Mounted only, £5.

THESE PRICES DO NOT
INCLUDE SALES TAX.

Spot Frequency Crystals
Prices on Application.

Regrinds £1/10/0

MAXWELL HOWDEN
15 CLAREMONT CRES.,
CANTERBURY, E.7,
VICTORIA

DISPOSAL BARGAINS

Telechron American Motors, 1 r.p.m. and 2 r.p.m., band new, 45/-	5/6
Thermostat Switches, various amperages	.....
Yaxley type Switches	3/-
0.5 and 0.1 mfd. 2,500 volt working Condensers	1/-
Throat Microphones	5/6
A.W.A. 153 type Transmitters, 3 units, complete, £50 cash or terms.	.....
P.M.G. Type Relays, 300 ohms to 10,000 ohms, brand new, 10/- ea.	.....
Micro Switches	5/6
500 mfd. 40v. Block Condensers	2/6
Power Transformers, 400v. c.t. 400v., 250 mA.	50/-
Filament Transformers, 6.3v., 5v., and 4v.	40/-
Microphones	10/-
Electric Motors, 230v. ½ h.p.	75/-
24v. Electric Motors	10/-

We are continually wrecking ex-Government Surplus Radio and Electrical Equipment—See Our Big Display.

CARR CAMERA DISPOSALS
305 SWANSTON STREET, MELBOURNE, VIC. FB 1831

DURALUMIN, ALUMINIUM ALLOY TUBING IDEAL FOR BEAM AERIALS & T.V.

★ LIGHT ★ STRONG ★ NON-CORROSIVE
STOCKS NOW AVAILABLE FOR IMMEDIATE DELIVERY
ALL DIAMETERS—4" TO 3"

Price List on Request
STOCKISTS OF SHEETS—ALL SIZES AND GAUGES

GUNNERSEN ALLEN METALS PTY. LTD.

88-92 YARRA BANK RD.,
STH. MELBOURNE, VIC.

Phone: 69-2121 (10 lines)
Telegrams: "Metals" Melb.



HANSON ROAD,
WINGFIELD, S.A.

Phone: 4-3362 (4 lines)
Telegrams: "Metals," Adel.

AMATEUR RADIO EXHIBITION AT GEELONG, VIC.

AN exhibition of Amateur Radio equipment was held by the Geelong Amateur Radio Club on 9th and 10th September, 1960. The purpose of this exhibition was to acquaint the public with all phases of Amateur Radio as practiced by licensed Amateurs and S.W.I.'s. in Geelong, and to give the more technically minded the opportunity to meet together to discuss their mutual interests.

The Exhibition was officially opened on Friday evening at 8 p.m. by the Minister for Shipping and Transport, Mr. Hubert Opperman, M.H.R. Following the opening, Mr. Opperman presented the G.A.R.C. Perpetual Trophy to the winner of the competition for the best

news, VK3SY; A. Bell, VK3ABE, to whom the Club extends its thanks for the conscientious manner in which this rather difficult task was carried out.

The range of home-constructed equipment on display, the greater part of which was not in the competition, was very comprehensive and included such items as an a.t.v. transmitter, a flying spot scanner and a 1 to 1 converter (1 metre to channel 1); a 24 inch t.v. receiver and a 5 inch receiver built from "disposals" parts.

The a.t.v. equipment operated on 288 Mc. For 1,296 Mc. operation, there was a complete station including the large parabolic antenna. For the lower bands, a 60 watt transmitter, using a Geloso

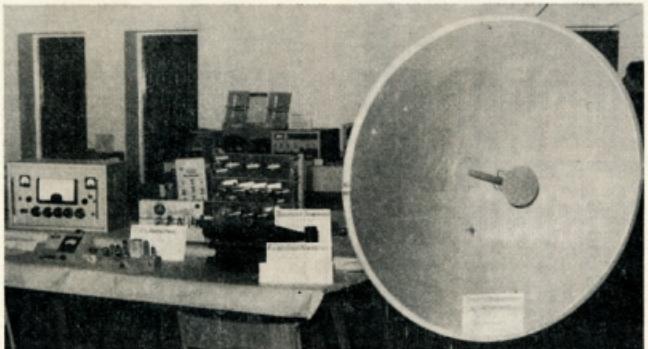
v.f.o. and 6146 p.a.; also a s.s.b. generator. Test equipment was represented by the inevitable but very useful g.d.o., c.r.o. monitors, audio oscillators, etc. The mobile display included crystal controlled transmitters, modified Command receivers, a field strength meter, d.f. loops and whip antennae.

A number of commercial firms were invited to exhibit Amateur equipment currently available, and of interest were various Heathkit items from Warburton Frankni, a s.s.b. generator from the Amateur Radio Service, Albury; A. & R. Transformers and Zephyr Microphones from Mr. A. J. Forster, of Brownbill's Amplifier Service; and an experimental projection t.v. receiver, with an imported German model alongside for comparison, from Mr. Davies, Geelong.

"On the air" demonstrations of Amateur Stations operating were given by VK3ABK and VK3ZAV on 144 Mc.; VK3ABT on 3.5 and 7 Mc.; with VK3ANG and VK3ATL working some real DX on the international bands.

The South Western Zone W.I.C.E.N. group was active and stations which provided loud clear signals for the benefit of an interested group of listeners were VK3IC/Mobile, Geelong; VK3AKN, Broadwater; VK3XE, Hexham; VK3ARJ, Wangoom; VK3AGD, Dunkeld; VK3AMS, Drysdale; VK3ADN, Lismore. (Thanks chaps for your cooperation after an unavoidably long delay in commencing the net.)

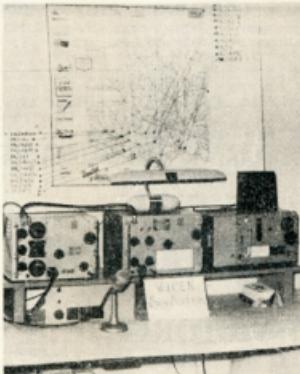
Club members appreciated the interest shown in the Exhibition by the Wireless Institute of Australia, which was represented on the Federal level by Bob Boase, VK3NI, and for VK3 Division by Michael Owen, VK3ZEO (State Secretary) and Keith Roget, VK3YQ (State Treasurer). ●



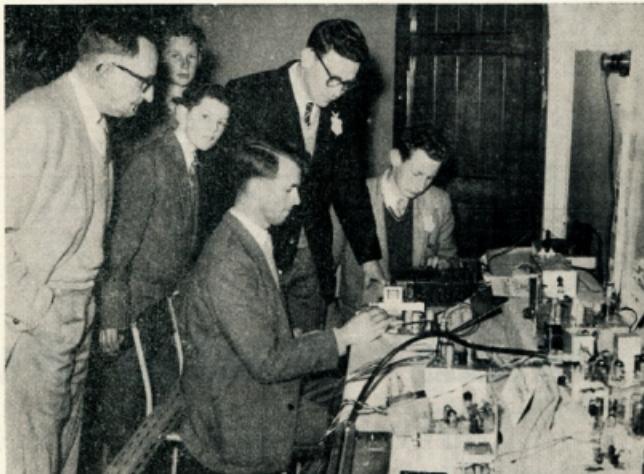
Some of the home-constructed gear at the Exhibition. On the right is a parabolic antenna (mounted behind the antenna).

piece of home-constructed equipment (VK3ABT).

This competition, which is to become a regular feature of the Club, has been inaugurated to encourage members to build their own gear. The judges were Messrs. E. Kosseck, VK3AKE; J. Mat-



The W.I.C.E.N. Base Station of the South Western Zone, Victorian Division, W.I.A.



Dick Heighway, VK3ABK, demonstrating a piece of v.h.f. equipment to Club President, Harry Michael (black coat) and Club member Ron Cook (sitting down on right of photo), with interested spectators on the left of the photograph.

DISPOSAL BARGAINS

CRYSTALS

ALL £1 EACH.

THIS MONTH ONLY.

Type	Kc.	Type	Kc.	Type	Kc.
DC 1985	DC 2096.25	DC 2338.05			
DC 2007.5	AWA2103.1	DC 2368			
FT 2070.	FT 2260	AWA2442.5			
FT 2075	DC 2336.4	DC 2595			
FT 2085	DC 2338	DC 2665			
	DC 2338				

AWA3030	DC 3332.5	DC 3488.5			
DC 3055	FT 3340	AWA3545			
FT 3184	L 3432.5	FT 3500			
FT 3195	DC 3440	DC 3536			
DC 3266.25	AWA3450	L 3600			
DC 3287.5	L 3460.5	FT 3650			
DC 3313.5	L 3467.5	FT 3840			
L 3320		FT 3885			
FT 4025	FT 4445	L 4742.5			
FT 4035	FT 4490	L 4750			
FT 4080	DC 4495	FT 4765			
L 4096	FT 4495	FT 4780			
FT 4124	FT 4520	FT 4815			
FT 4240	FT 4540	FT 4840			
FT 4255	DC 4549.44	FT 4852.5			
FT 4280	FT 4550	L 4870			
L 4285	FT 4620	FT 4880			
FT 4295	DC 4660	FT 4895			
FT 4360	FT 4672.76	FT 4930			
L 4396.7	FT 4676.11	FT 4950			
FT 4397.5	FT 4735	FT 4965			
FT 4397.5		FT 4995			

AWA5161.6	FT 5437.5	FT 5744			
DC 5170	FT 5480	DC 5770			
FT 5180	DC 5515	FT 5773			
FT 5205	DC 5530	FT 5775			
DC 5210	FT 5535	FT 5780			
FT 5245	L 5551.5	FT 5782.5			
AWA5280	FT 5552.5	DC 5810			
DC 5285	DC 5590	FT 5815			
FT 5295	FT 5635	DC 5840			
FT 5327.5	FT 5660	FT 5850			
FT 5360	FT 5665	FT 5855			
FT 5365	DC 5700	L 5897.5			
FT 5397	FT 5706	FT 5910			
DC 5410	DC 5710	L 5910			
FT 5410	DC 5710	FT 5920			
FT 5435	FT 5725	DC 5950			
	FT 5740				

POWER TRANSFORMERS

385 volts aside, 100 mA., 6.3v. at 3 a., 5v. at 3a. Brand new. 45/-.

410 volts aside, 80 mA., 12.8v. at 1.25a., 5v. at 2a. 40/-.

"Ham" Radio Suppliers

(KEN MILLBOURN, PROP.)

5A MELVILLE STREET, HAWTHORN, VICTORIA

North Balwyn Tram Passes Corner

Phone: WM 6465

Money Orders and Postal Notes payable North Hawthorn P.O. Packing Charge on all goods over 10 lbs. in weight, 5/- extra.

VALVE SPECIALS

DL75 sub. min. power output pentode, primarily intended for hearing aid.

Fil. volts 1.25 at 25 mA., h.t. volts 90 volts 3 for £1, 7/6 each.

EC79/6K4 u.h.f. osc. triode, 8-pin min. 3 for £1, 7/6 each.

EF70 sharp cut-off r.f. pentode, 8-pin min. 3 for £1, 7/6 each.

EF72 r.f. pentode, 8-pin min. 3 for £1, 7/6 each.

EF73 remote cut-off pentode, 8-pin min. 3 for £1, 7/6 each.

EC91/6AQ4 g.g. triode, freq. limit 250 Mc., 9-pin min. 10/- each.

832A valves, new in carton. Few only available 19/6 each.

VALVE SOCKETS

Octal valve sockets 6 1/6 each.

English 8-pin min. sockets 1/6 each.

Loctal valve sockets 1/- each.

Acorn valve sockets, ceramic 3/- each.

Min. 7-pin valve sockets, 9d. each, or

8/- a dozen.

Ceramic 5-pin 807 valve sockets, 3/6

EF50 valve sockets 3/6 each.

PLUGS, CABLES, DRIVES

AT5/AR8 Cables, 10 ft. long 10/-

Command Receiver Flexible Drives, 12 ft. long 10/-

Octal Plugs, with dust cover 1/- each.

FUSES AND FUSE HOLDERS

Twin Cartridge Auto Fuse Holders, enclosed, bakelite case 2/6 each

Fuses, Auto, all types 5 for 2/-

Fuse Holders, round type 3/6 each

VARIABLE CONDENSERS

120 pF. ceramic, 1/2 inch shaft, 10/-

Three-gang (R1155 type), ceramic insulation 17/6

Four-gang, 150 pF. per section, ceramic insulation 15/-

Two-gang, broadcast, ceramic 12/6

Single-gang, 0.0005, ceramic 7/6 each

MIN. VARIABLE CONDENSERS

Screwdriver adjustment, silver plated.

Sizes available: 25, 55, and 80 pF.

7/6 each or Three for £1.

SWITCHES

Switches, d.p.s.t. toggle, SCR536 type, 5/- each, or 5 for 20/-

Switches, s.p.s.t. toggle, new 3/6 each

STEP-DOWN TRANSFORMERS

230 volt to 110 volt, 1kv.

£8/10/0

CORRESPONDENCE

Any opinion expressed under this heading is the individual opinion of the writer and does not necessarily coincide with that of the publishers.

AMATEUR T.V.

Editor "A.R." Dear Sir,
I found it rather hard to get at the real point of a recent letter from VK3AWW/T and I was at first inclined to write to Dennis personally, feeling that his equally spirited letter was directed more to a minority than to my remarks. However, a public hearing has been opened and the accused subpoena'd, leaving me no choice.

Although my existence has, until now, been unknown to most VK3 friends, word of his activities and those of a few others has filtered through, although complete details are lacking. I can assure him that I have read all earlier issues of "A.R." since 1948 and any mention of A.T.V. was not there. As far as I am almost daily contact with Bill VK3BXX/T who is approximately 2 miles distant in the same suburb, I feel that this can be regarded as being in contact with Dennis and his immediate associates.

I might add that I have had an active interest in the possibilities of A.T.V. since 1950. I have written to the Australian television industry. For several years now I have been preparing for the day when consistent a.t.v. communication becomes possible. I realise the present difficulty of making on-the-air contacts over distances is a fact, and any implication that it is not in a favour of closed circuit activities could hardly be justified, since this has been my own method of approach. This is where "A.R." comes in as a communication channel making it possible to keep in touch with activity, both local and interstate.

A proposed constructional article on a flying spot scanner, using electrostatic deflection and focus, is being considered here, and several others who have built machines of one kind or another have been approached to do likewise. My letter in July "A.R." has brought forth correspondence asking for this very information.

The question of standards is one which is partly answered by the P.M.G.'s Department, but any project should be planned to include future adaptation to possible expansion of activity. In this regard I have followed the lead of Eric VK3EYC/T, as indicated in my July letter, and I see no argument with this. I was pleased to see the letter from G. M. Sander "A.R." in which he quotes Geoff VK3AWW/T describing his equipment, and I hope that this example will be followed by a large percentage of the 136 suffix T calls listed in the latest Call Book.

—Richard J. Heighway, VK3ABK/T.

CARTOONS

Editor "A.R." Dear Sir,
Ref. the item in "A.R." for Sept. on p.22 at bottom right hand corner headed "Cartoons" we (that includes the rest of the family) are all for a page of the best. I hope that of Jesus on the DX page of "QST" will be included.

We also enjoy the ones by Lindsay VK3ZEW. The trade mark being the "Moggy" and the remains of a fish. It is surprising the places these two turn up, particularly up on a beam! That one in the July issue could make a good advert for Minitubs, wonder what VK3XPF has to say about it?

Glad to see a Sideband column, one of these days I will be playing with it. If I get a full ticket, I will use s.s.b. exclusively on h.f. band and try to on v.h.f. Keep up the good work on "A.R."

—John M. Withers, VK3ZCO.

S METER CIRCUIT

Editor "A.R." Dear Sir,
Congratulations on the excellent 8 meter circuit published last month. It's very fine having a meter that swings full scale with a strong signal instead of half-heartedly dropping to zero.

One comment is that a pot is unnecessary as cathode resistor (R4); fitting one on a receiver could present difficulties. Once the right value is found, adjustment is not needed, as the meter should not go too far across—that's one of the beauties of the circuit!

I spent about three hours trying to make a 0-10 mA. meter work. Substituting an 0-1 mA. meter made everything right in about three minutes. The article blithely says "The resistors, network, etc., are to be commensurate with whatever meter may be available"; don't you believe it?

If the meter is drawing 10 mils, then the tube needs to draw a lot more to deflect the needle. So there has to be cut the tube off till 10 mA. flows again in the meter; some a.v.c.! If you must use a 10 mA. meter, run the B plus of an i.f. amp. tube through it, and a reasonable deflection will be seen when a.v.c. is bypassed.

Another objection to burning 10 mils through an 8 meter is the heat that must appear somewhere. Four parallel one-watt resistors over-heated in a few minutes.

—Rev. Bro. D. L. Kinsella, VK2AXX.

ABOLITION OF C.W.

Editor "A.R." Dear Sir,
Congratulations on the long-awaited feature on Sideband and all marks to Bud Poussart for getting on with the job in such a practical down-to-earth and friendly manner. If this induces more to join the sideband ranks, it will have achieved its purpose and I'm quite convinced that it will do so.

As I see it (in a brief six months of exclusive sideband operation) two major problems face us in getting more to the sideband ranks. The first is to know the feeling that sideband is consolidate. For the amateur minded simple and effective transmitters can be built and for the non-technical (and I must admit to falling into this category) there's commercial equipment readily obtainable now that import restrictions have been lifted.

The second problem is this: is it a real one—is to get the amateurs for sideband on 14 Mc. seems to be by far the most popular, yet all are concentrated in the top 75 Kc. of the band. There's much W-band QRM. S.s.b. must use more and more of lower frequencies as raised so well by Poussart.

Many theories have been submitted for band re-allocation. May I submit this one: 14,000-14,400 c.w.; 14,040-14,140 a.m. phone; 14,140-14,200 s.s.b.

Given as a form of communication is outmoded and no longer necessary (I see no useful reason whatsoever for its inclusion in the A.O.C.P. examination), but my suggestion gives these chaps 40 Kc. for the time being. After a reasonable period of time, if the majority agree, we could hand this over to a.m. giving this form of communication the bottom 100 Kc. and s.s.b. the next 100 Kc., i.e. 14,000-14,100 a.m.; 14,100-14,200 s.s.b.

Here's to the abolition of c.w. at least on the DX bands, and the riding of our ranks of these strange chaps who sacrifice all (including in most cases their families) for that one country, the majority of which are uninhabited.

—Roth Jones, VK3BG.

DIATHERMY INTERFERENCE

Editor "A.R." Dear Sir,
Monitoring the high frequency bands over the past months I have noted an alarming degree of spurious radiation from so-called diathermy machines operated by members of the medical profession.

Examination of a number of these installations shows that in every instance the equipment is of a most elementary type comprising a self oscillator supplied with raw r.a.c. plate power and providing no means of effective frequency stabilisation.

Complete lack of screening or line filters allows these machines to radiate from electrodes and power mains to a degree that such signals have been detected over wide areas.

Commercial diathermy machines operated by skilled practitioners in screened rooms, possess negligible radiating power. However, the type of unit sold to medical practitioners operates with electrodes in the form of flat spirals or helices according to the theory of the electrically heated treated. They possess negligible electrostatic field penetration, and as the assignee of several world wide patents on inductive and dielectric heating equipment, I do not without fear of contradiction, that the dielectric heating claim is as spurious as the widespread interference they so readily radiate.

Apparently these machines were deliberately designed to have negligible deep heating penetrance and so cause more harm to the pocket book than the hide of the patient when used by medical men entirely lacking in electronic therapeutic knowledge.

Questioning one medical practitioner operating such a machine as to the frequency employed, he looked at the dial and said vaguely, semi-sarcastically, "It says 50 cycles". On measurement I found that the oscillator of this particular machine worked on 14.6 Mc. with a field capable of being detected on an amateur receiver in the street beneath the incoming power lines.

Other machines in the Northbridge area wobble about between 16 and 18 Mc. with

abominable "T.I." notes having strong harmonics up to 100 Mc., and some right on Channel 2 T.V. Seeking the co-operation of a very bad offender, suggesting housing of the equipment in a screened room, I was informed "It wouldn't be worth it". It would appear from this that the profit motive and not the patient is the main concern.

Just imagine what would happen if an Amateur station owner attempted operation with a highly unstable oscillator fed with raw a.c. to the plate, and no regard to whatever frequency might be resulting.

During the War, medical practitioners were not allowed to use diathermy equipment unless it was operated within a screened room capable of negligible external radiation. Automobile ignition interference and that from pilot arc welders soon made effective attenuators, and welding machine manufacturers would be put to the expense of a few pounds per unit to cure this.

Having literally and figuratively poured approximately £3,000 "down the drain" in an ineffective intervention at the Geneva Conference, it is high time that the Wireless Institute of Australia sound a communal loud alarm with regard to the hamstringing forest of regulations cluttering the operation of their members' stations.

I for one would gladly give my donation to such a fund.

—J. G. Reed, VK2JR.

A NEW CERTIFICATE

Editor "A.R." Dear Sir,
The recently formed Elizabeth Amateur Radio Club is issuing a Certificate known as "The Elizabethan Award" to any Amateur who has worked a number of stations situated in England, Scotland, Ireland, and Wales, painted black on white, is signed by the Elizabeth Amateurs who are listen in the application.

1. Amateurs who reside in the VK Areas 1 to 8 inclusive require eight (8) contacts.
2. Overseas Amateurs require six (6) contacts.
3. Any QSO on 50 Mc. or above counts as two contacts.
4. Any QSO with the official club station (the call sign of which has not yet been allocated) will count as two contacts.
5. S.W. Listeners may apply, but must include the name of the station being worked by the Elizabeth Amateurs. (Calling CQ will not suffice.)
6. Applications may be made giving log details (date, time, band, etc.). QSL cards not required. They should be sent to the Hon. Secretary, 142 Woodford Road, Elizabeth North, South, Aus. and enclose a 5d. stamp (Overseas applications should send two International Reply Coupons).
7. All QSOs must be after 1st January, 1960.

Some of the Calls from Elizabeth are: VK5SBP, 5BS, SDY, SEU, SEJ, SEP, SFY, SHA, 5KD, SNO, 3NQ, 5PE, SPF, 5QX, 5ZJN, STM.

—Ron A. Catmur, VK5FY, Hon. Sec.

VISITING AMATEURS

Editor "A.R." Dear Sir,
On several recent Interstate visits some difficulty was experienced in contacting Amateur friends in other cities due mainly to lack of local knowledge, and secondly, due to some of these friends "not being on the air whilst I was in their area".

The above brings forward the thought of Interstate contact points for visiting Amateurs.

Further to this, what I had in mind is a phone number or numbers in each capital city, this number to be registered with all other Divisions of the W.I.A. so that an Amateur were to get in touch with his local Division of the W.I.A., he could then receive the appropriate number or numbers. So that when he arrived in Brisbane, Sydney or Perth, etc., and wanted to meet Amateurs, he could contact the appropriate number and make suitable arrangements.

Extending this idea further, if one were to go touring (without visiting a capital city) the road maps as issued by the R.A.A., R.C.A., or A.C.A.V. etc., could be obtained on behalf of the member by the appropriate Division of the W.I.A. and suitable notations made beside the towns along the route, indicating what Amateurs are in each town. Of course, one could not expect that all the Amateurs are available for night time visits and which are available for day time visits, or inversely, who might or might not welcome visitors during working hours. The latter might complicate the scheme a little in that each member would have to indicate his desire in this matter.

It is envisaged that the foregoing or a variation of the scheme would be Australian wide.

(Continued on Page 34)

It's me again. Hi there gang, how's everyone this month? Have you plenty of DX to report?

Well the R.D. Contest is over for another twelve months and by the time you read these notes we will be into the VK-ZL Contest, where you all the best of luck from the VK3 gang.

Seven of us went down to Rye for the R.D. Contest and only for the high noise level, we all had a mighty time. The noise was so bad that we had to stay up, pack it up and went home by 1600 hours. We hope to repeat these get-togethers in the coming years; even if we don't score well, we get to know each other very well. The scoring wasn't too high, 648 points to the highest and that was me. The thing was, we had a good time.

On Friday, 26th Aug., we of VK3 held our Annual General Elections and here as follows are the new office-bearers: Mac Hillard, L3074; President; Ian Thomas, L3065, and Mike Ide, L3015; Vice-Presidents; Mac Cox, L3055; Secretary; Alan Secretary; Harry, L3052; Treasurer; Secretary; Ian Thomas, L3065; and the organising Committee is made up of Messrs. Hillard, Cox, Woodward, Young, Hayward and Ide.

Sometime in February of next year, 1961, it is hoped that the VK3 Group will hold a S.w.l. Convention at Shepparton. Would all those interested please contact me so as we could have a fair idea how many of us will be there. More about this Convention in future issues.

The Oceania Contest was won by a VK4 S.w.l.er, Charles H. Thorpe, of #1 Dawson Road, Rockhampton, Qld. He scored 50 points. Congratulations Charles, a very fine effort when as you say "you're not being competitive". Well done indeed. Second was Don Grantley, L3086, who scored 28 points, and third placing went to Eric Treblecock and myself, both scoring 16 points each. These were the only four logs received; rather disappointing, don't you think? I am sorry by the way, that there were a lot of logs in the R.D. Contest, but you can't enter a simple one like the Oceania Contest. What's the matter, was it too hard for you all? If it was, all I can say is that none of you would have wave listeners. Let's hope the next time we have a contest that the committee receive more logs. Don't forget we run these contests for you supposedly short wave listeners.

As I mentioned last month, I am still waiting for some letters from our country members, so far none to date. Also a photo of yourselves and rig for this page. I hope to be able to put one in for the November issue. So drop me a line with your photo chaps.

I would like to see more members attend the VK3 Group meetings because the organising committee has a lot of good ideas that are going to benefit you all.

VICTORIA

As you already know, we had our election of office-bearers at the last meeting. Eighteen members were present, which was a sight to see. It is hoped by the officers that these 18 and more will come along to the future meetings; we have a lot of good ideas to put into being which will benefit one and all and we intend to do just that.

Quite a lot of the lads are young and have not receivers; if any Amateurs who read this page have any old communication receivers that have broken down and are lying around in the back corner, for the love of God, about donating them to the S.w.l. Group; we would be very grateful for them. These chaps are very keen, but without receivers, they can't get really enthusiastic. Also, any junk you don't want, we could use it—thanks very much.

Future visits and lectures by this Group are to date a visit to George Palmers, and another talk from BERS-195, Eric.

NEW SOUTH WALES

Gerry Albreck sent along some of the news from VK2 S.w.l. Group and comment on the following. L2022 is the official scribe for the

S W L

Maurice Cox, WIA-L3055
Flat 1, 37 Boyd Crescent,
Olympic Village, Heidelberg,
N.S.W. 3125, Victoria.

VK2 Group and Gerry is helping a little (good for you, OM). He says the last two meetings were held with very poor attendance. Come on now VK2, with all those listeners' numbers you should have at least 60 at each meeting. You don't want other States putting you to shame!

Rod de Balfour paid them a visit at the last meeting. How are you Rod? How's studies? Gerry ran a contest, but due to lack of space only half the rules were printed, but he did one log for 1960. Well, though, but I'm hoping for more log entries in coming contests. This will be on general short wave, so get those logs in you chaps. My word Gerry does a lot of s.w.b.c. listening and has done well. I hope for our own s.w.l. contests soon. Gerry, and tells me that the VK2 Group are now 2 yrs. 5 months old and have membership of 160; if that's so, I would say 100 should be present at the meetings.

SOUTH AUSTRALIA

From L3031, Colin Hutchesson, the VK5 news. The boys down at the mount were very busy for the R.D. Contest, setting up their gear. L3031 says he's sorry for not sending in a log for the "A.R." Contest as his receiver was sick; oh well, better luck next time Colin. His boy band conditions were shocked 15 and 15 mx. L3031 has been in contact with Bob Simmonds the lone s.w.l. of Iron Knob and reports that he is still an active listener and seems to have a very good set-up; using an R115 receiver on 80, 40 and 20 mx and G-1000 power converter on 15 and 10 mx and by this time he has probably erected the WS5 all-band antennae. Colin says there is not much new from down this way, things are pretty quiet at the present. I am sorry to report no news this month on VK6 or VK7. This is very unusual. VK7 what's about some news from the Apple Isle group?

CORRESPONDENCE

Firstly, we welcome new members to the VK3 Group—P. Devitt, G. Huckerby and S. Logvenenko. Additionally, the S.w.l. Correspondents, who can forward names of new members for inclusion in the S.w.l. Notes of "A.R." have received mail from ZL1AG (BERS195), L3088, L3072, L3074, L3061, L2010 and L2021. From ZL1AG (BERS195) he is in QRL; what's not out each evening and even at week-ends. He doesn't have a minute free. (I shouldn't think so, Eric, what with following the Magpies, etc.) Unfortunately Eric's address in the R.D. Contest is wrong. He should read 340 Gillies Street, Thornbury, N.17, Vic. In the R.D. Contest, Eric put in 20 hrs. and claims 245 stations for 601 pts. He thinks all of us did equally well, or, er, not better. His total logs were not 100, or 200, 772. His newswave serial number for 1960 are 1964; his inwards card for 1960 total 576, 34 zones, 10 countries. His most recent received QSL is FG7FX, ZL4JF, both firsts, KR6IQ, OX-3DL, Zone 40; VQ2CZ, ZL1AG, ZCMAK, and ZL1AF. He thinks his next appearance at an a.s.w.l. meeting, maybe he will make it before the end of the year, but it's no certainty.

Arising from Eric's own experience both as an s.w.l. and DXer, also Acting Federal QSL receiver, he would like to draw attention to all V.E. S.w.l.'s who send out cards via the Bureau. To make sure you write in the call sign of the addressee in the top left hand corner of the reverse side of the card. It sure helps the poor sorting guy. L3088, Don Grantley. Don had a hectic R.D. weekend, nothing went right. He couldn't get the 3HB 40W transmitter on antenna at home, anyhow he slung up 136 ft. East and West 20 ft. high and logged about 1,015 pts. What were you loafing, Don? And he made do with an A.R. receiver work even on 10 m. Yes. Don is a winner, and was 16. He didn't hear a VK8, Mac, and I did for a couple of minutes but that was all. Don says who wins the R.D. will have to score about 1,400 pts. He reckons he's going to knock 11,000 pts. in the VK-ZL Contest. He did in fact.

By the way he's moved into his new QTH in Albury and reckons it's 1 lb. By Sunday

night he had the shack organised and the ART working; has not as yet got up a big antenna, only a short one 15 ft. high, 40 ft. long. Says he's the only s.w.l. with a frig. in his shack. Says the bands have been very good the last few days. He listened for 10 minutes and heard 100 logs.

L3088, K. Walsh. A new member to the s.w.l. ranks. He doesn't possess a receiver and he believes it possible to buy an old ART or AR3 at a very low price. Well I don't know about that, but you can in the "Age" newspaper of a Sat. and you may find something suitable. Can anybody help him? We of the Group are always on the lookout for receivers, as there are quite a few of the boys without one. If I hear of any I will certainly let you know.

He had a lend of a receiver and has logged quite a few stations. Thanks, Kevin, hope to see you at the meetings soon.

L2011, Gerry Albreck. He says the broadcast band is held and his score at the moment is: s.w. 158 countries heard 8 QSL cards, plus 6 letters received. B.C. band, 12 countries heard, 1 QSL, Hawaii. The best DX was from L1W and the best DX he did log was on L1W. He has heard 1000 stations in Russia 164 Kc. 1229 with 500 AW. His total log going on the b.c. band is at the moment over 60 stations from 12 countries, not including Australia, which, incidentally, he has logged 118. His receiver is German 24 valve a.m./i.m.

L2211, Charles Atherton. He's only a new member and started his log book in April all ready he has heard 31. All stations and confirmation of five. On the s.w.b.c. heard 26 and 11 confirmed. Not bad for a beginner: he is using a Hallicrafters SX28. He put a log in the R.D. Contest and scored 723—cricket! He logs in the evenings in passing time to the VK2 Group three months, plus a very strong letter from him re their organising, etc., for them to allocate him a number.

Charles thinks they should have a page of do-it-yourself hints for the s.w.l. and a page of new s.w.l.; Chas. had to find out these things by reading "A.R." and writing to various persons. He received a card from ZL1AG who also sent him a copy of the Call Book. Chas. comments on the fact that it's a pleasure to know that some of the Amateurs are very helpful. Could you have a point there, Chas? He began to try and get a card from each State of VK land, but found it hard to drag one out of them. (The reports have to be really good, but keep trying.)

L2071, Col. Hutchesson. He would like to know how VK3 fared in the R.D. Contest and how the noise level was at Rye. Colin, it wasn't too good at all; I used the noise limiter, but not so good. It distorts the speech quite a bit, but it have to be attended in the near future. He hasn't seen the one published in "A.R." and it is very good.

Col. has his 7-tube receiver going well on 39 and 40, but has struck trouble on 20 and 15; the signal pour in, then suddenly a hissing noise cuts in swamping the weak signal. He hopes to rectify this before the VK-ZL Contest, but doesn't know what to do about it, as yet.

Four s.w.l.'s are using the two 6AC7s pre-amplifier. It's very popular in the Mount and Albion areas. The man from the ZL1AG Club has been busy winding coils for the 7-tube receiver; he wound the 80, 40, 20 and 10 mx coils and when trying to locate 10 mx on what he thought would give him 10 mx, he was most surprised to hear a strong sounding CQ 15. (Colin, it could have been the ZL1AG fault; may have forgotten he was on 10 m.) I've heard that quite often, check your coils again.

Two 40 ft. poles have been erected by him and the antenna in use is a 7 Mc. dipole and does, as he quotes, "an excellent job on 20 and 15".

L3074, Mac Hillard. Mac said he may go to Alpine Springs about the end of the year and if he does, he will take his 6 m. converter and have a go in the Hamfest, as a port-a-call VK3 s.w.l. This idea is in the making at the moment, according to Mac. Mac heard

(Continued on Page 34)

VK6

From Western Australia comes a report on Sideband activity in the wild flower State. Our reporter is Vic Kitson, VK5VK, who has been a sidebander of several years' experience. Here is what he writes:

"Since 1958 s.s.b. activities in this State have increased at no slow rate. At present there are 100 stations using s.s.b. in the State, up-to-date with regard to Amateur operation. At present some nine stations are using this mode. The most recent of these is Graeme VK6GR.

"I recently had the pleasure of looking over the fine 3251 at VK6CS; indeed a very compact unit. This would be the model up-to-date with s.s.b. transmitters in the State. Another very compact unit, still under construction, is the W2EVL Exciter being built by Ray VK6ML. Looking forward to hearing this one on the air. Also it appears that VK6BE may be the first in the State to use a high frequency xtal filter rig, still under construction. Another well known station is VK5NF, who is also in the process of re-building.

"There has been some activity on d.s.b., with VK6GU doing the most work in this field. At present the most popular is using up some gear for d.s.b. is VK6FX.

"V.h.f. has been invaded with lack of carrier by VK6BJ, who has a d.s.b. rig working on 50 Mc., and only contacted eight or so of the city v.h.f. groups. The problem is to encourage the other calls to learn how to drive his receiver, s.s.b.-wise.

"Listening around 50 mx has shown a steady amount of s.s.b. and d.s.b. working most nights. At my location, VK1IGW has a most consistent signal. In the State VK6GJ and VK6VK are heard some evenings. Sunday mornings, 40 mx was "singing with sidebands": 6CS, 6MK, 6RU, 6CR, 6AV and 6VK, also 6KJ.

"20 mx continues to show some changes with various field openings to all parts of the world. T35, VK6VK."

NEW SIDEBAND STATIONS

I am very pleased to extend a welcome to Stan VK1ASB and Mac VK3RV.

From Canberra, IASB has a xtal filter rig using low frequency xtales and heterodyning straight to 7136 Kc. xtal controlled. The circuit

SIDEBAND

Bud Pounsett, VK2AQJ
22 Sniffert Centre,
Queanbeyan, N.S.W.

uses a T260 tube as a balanced modulator and another as a balanced mixer. The carrier suppression is exceedingly good and this tube does everything that Bud claims. A 6145 in AB1 delivers the signal to the antenna. And Stan about his new shack—it is just as old as his sideband rig. Melbourne has yet another fine s.s.b. signal and this time from 3RV. Mac should have his 807 linear in operation by this time. His design is of the phono type and uses 12AT7 in the balanced modulator and 9 Mc. V.f.o. control is obtained with the oscillator section of a Command transmitter tripling to 16 Mc. for 7 Mc. operation. The frequency stability is very good indeed. When I contacted Mac he had a 100 ohm 3 watts carbon (three 300 ohm 1w. resistors in parallel). C1 is 170 pF. silver-mica capacitor.

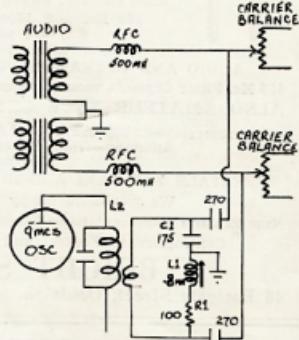
CR3AH

In a recent conversation with an old friend, Johnny CR3AH of Macau, I found why Johnny has been absent from 20 metres. He had the misfortune to have his beam in the path of a typhoon which left the director in the form of a U and the reflector standing like an S. He now has it repaired and can again be worked with the greatest of ease. That three element beam really works. John's rig is a xtal filter job with a pair of 813s in the final. A 75A4 takes care of reception.

BETTER R.F. PHASE-SHIFT

Several of our VK sidebanders have gone over to the r.f. phase-shift network which appeared in November 1959 "Co." magazine. They all report that this phase-shifter is easier to work and stay put. It can be readily included in your present rig and I strongly recommend it for your new one. W2EVL designs can be modified in very little time.

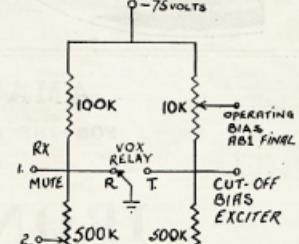
The improved phase-shift network was the work of Lester Eshnaw, ZL1AAK. For 9 Mc., the link on L2 is wound at the "cold" end of the coil and consists of 5 turns close-wound. L1 is 9 turns wound on a $\frac{1}{4}$ inch diameter iron slug. Wind the coil on a $\frac{1}{4}$ inch bolt first. The closer the iron core is

CARRIER BALANCE

to the coil, the greater will be the inductance variation. Put 100 ohm 3 watts carbon (three 300 ohm 1w. resistors in parallel). C1 is 170 pF. silver-mica capacitor.

T.R. CONTROL

After the VOX relay, what then? This has presented us with some problems in the past. I hope that this simple circuit will solve your problem. About three years ago, YULAD gave me this circuit over the air and it has been in service at VK2AQJ ever since. It uses only one set of relay contacts, in my case, the squelch relay from an SCR522 receiver.



You have two choices for receiver muting, either from point 1 or 2. Point 2 will give you more control on your receiver sensitivity and allows you to monitor your own signal while transmitting, but only if you are listening on that frequency. If you consider this unnecessary, you may use a 500k resistor in place of the potentiometer. If you use a zero bias, you may also use a 10k fixed resistor instead of the variable one. To mute the receiver, I have found that connecting the suppressor grids of the r.f. stage(s) and the control grid resistor of the first audio stage, suitably bypassed to point 1 or 2, very effective. Applying bias to the a.v.c. line has undesired (Continued on Page 34)



One of our ardent Sidebanders is Keith VK2BK, of Bondi. Here he is with the equipment that puts out that big loud signal. The transmitter is located above Keith's left shoulder and is the old favourite W2EVL design. A remote v.f.o. is responsible for the excellent stability while an SS38 and much modified CR100 takes care of receiving. Various test and monitoring equipment completes this neat living-room layout.



VACUUM MOUNTED CRYSTALS

for general communication frequencies in the range 3-14 Mc. Higher frequencies can be supplied.

THE FOLLOWING FISHING-CRAFT

FREQUENCIES ARE AVAILABLE IN

FT243 HOLDERS, 6280, 4095, 4535, 2760, 2524.

5.500 Ke. T.V. Sweep Generator Crystals, £3/12/6.

100 Ke. and 1000 Ke. Frequency Standard,

£8/10/0 plus 12½% Sales Tax.

Immediate delivery on all above types.

AUDIO AND ULTRASONIC CRYSTALS—Prices on application.

455 Ke. Filter Crystals, vacuum mounted, £6/10/0 each plus 12½% Sales Tax.

ALSO AMATEUR TYPE CRYSTALS—3.5 AND 7 Mc. BAND.

Commercial—0.02% £3/12/6, 0.01% £3/15/6, plus 12½% Sales Tax.

Amateur—from £3 each, plus 12½% Sales Tax.

Regrinds £1/10/-.



CRYSTALS FOR TAXI AND BUSH FIRE SETS ALSO AVAILABLE.

We would be happy to advise and quote you.

New Zealand Representatives: Messrs. Carrel & Carrel, Box 2102, Auckland.
Contractors to Federal and State Government Departments.

BRIGHT STAR RADIO

46 Eastgate Street, Oakleigh, S.E.12, Vic.

Phone: 57-6387

CHOOSE THE BEST—IT COSTS NO MORE

**Resin Core
SOLDERS**
for reliable connections

O. T. LEMPRIERE & CO. LIMITED
Head Office: 27-41 Bowden Street, Alexandria, N.S.W.
and at Melbourne • Brisbane • Adelaide • Perth

AMATEURS
FOR THE BEST RESULTS
USE

IRONCORE

★ POWER TRANSFORMERS AND CHOKES

★ BATTERY CHARGERS.

★ SCOPE AND ORYX IRON TRANSFORMERS.

★ STEPDOWN TRANSFORMERS.

IRONCORE TRANSFORMERS PTY. LTD.

HIGSON LANE, MELBOURNE, C.1

Phone: 63-4771

PREDICTION CHART, OCT. '60

Mc. E. AUSTRALIA — W. EUROPE S.R. No.

0	2	4	6	8	10	12	14	16	18	20	22	24
45	—	—	—	—	—	—	—	—	—	—	—	—
28	—	—	—	—	—	—	—	—	—	—	—	—
21	—	—	—	—	—	—	—	—	—	—	—	—
14	—	—	—	—	—	—	—	—	—	—	—	—
7	—	—	—	—	—	—	—	—	—	—	—	—

E. AUSTRALIA — W. EUROPE L.R.

0	2	4	6	8	10	12	14	16	18	20	22	24
45	—	—	—	—	—	—	—	—	—	—	—	—
28	—	—	—	—	—	—	—	—	—	—	—	—
21	—	—	—	—	—	—	—	—	—	—	—	—
14	—	—	—	—	—	—	—	—	—	—	—	—
7	—	—	—	—	—	—	—	—	—	—	—	—

E. AUSTRALIA — MEDITERRANEAN

0	2	4	6	8	10	12	14	16	18	20	22	24
45	—	—	—	—	—	—	—	—	—	—	—	—
28	—	—	—	—	—	—	—	—	—	—	—	—
21	—	—	—	—	—	—	—	—	—	—	—	—
14	—	—	—	—	—	—	—	—	—	—	—	—
7	—	—	—	—	—	—	—	—	—	—	—	—

E. AUSTRALIA — N.W. U.S.A.

0	2	4	6	8	10	12	14	16	18	20	22	24
45	—	—	—	—	—	—	—	—	—	—	—	—
28	—	—	—	—	—	—	—	—	—	—	—	—
21	—	—	—	—	—	—	—	—	—	—	—	—
14	—	—	—	—	—	—	—	—	—	—	—	—
7	—	—	—	—	—	—	—	—	—	—	—	—

E. AUSTRALIA — N.E. U.S.A. S.R.

0	2	4	6	8	10	12	14	16	18	20	22	24
45	—	—	—	—	—	—	—	—	—	—	—	—
28	—	—	—	—	—	—	—	—	—	—	—	—
21	—	—	—	—	—	—	—	—	—	—	—	—
14	—	—	—	—	—	—	—	—	—	—	—	—
7	—	—	—	—	—	—	—	—	—	—	—	—

E. AUSTRALIA — N.E. U.S.A. I.R.

0	2	4	6	8	10	12	14	16	18	20	22	24
45	—	—	—	—	—	—	—	—	—	—	—	—
28	—	—	—	—	—	—	—	—	—	—	—	—
21	—	—	—	—	—	—	—	—	—	—	—	—
14	—	—	—	—	—	—	—	—	—	—	—	—
7	—	—	—	—	—	—	—	—	—	—	—	—

E. AUSTRALIA — CENTRAL AMERICA

0	2	4	6	8	10	12	14	16	18	20	22	24
45	—	—	—	—	—	—	—	—	—	—	—	—
28	—	—	—	—	—	—	—	—	—	—	—	—
21	—	—	—	—	—	—	—	—	—	—	—	—
14	—	—	—	—	—	—	—	—	—	—	—	—
7	—	—	—	—	—	—	—	—	—	—	—	—

E. AUSTRALIA — S. AFRICA

0	2	4	6	8	10	12	14	16	18	20	22	24
45	—	—	—	—	—	—	—	—	—	—	—	—
28	—	—	—	—	—	—	—	—	—	—	—	—
21	—	—	—	—	—	—	—	—	—	—	—	—
14	—	—	—	—	—	—	—	—	—	—	—	—
7	—	—	—	—	—	—	—	—	—	—	—	—

W. AUSTRALIA — W. EUROPE

0	2	4	6	8	10	12	14	16	18	20	22	24
45	—	—	—	—	—	—	—	—	—	—	—	—
28	—	—	—	—	—	—	—	—	—	—	—	—
21	—	—	—	—	—	—	—	—	—	—	—	—
14	—	—	—	—	—	—	—	—	—	—	—	—
7	—	—	—	—	—	—	—	—	—	—	—	—

W. AUSTRALIA — N.W. U.S.A.

0	2	4	6	8	10	12	14	16	18	20	22	24
45	—	—	—	—	—	—	—	—	—	—	—	—
28	—	—	—	—	—	—	—	—	—	—	—	—
21	—	—	—	—	—	—	—	—	—	—	—	—
14	—	—	—	—	—	—	—	—	—	—	—	—
7	—	—	—	—	—	—	—	—	—	—	—	—

W. AUSTRALIA — S. AFRICA

0	2	4	6	8	10	12	14	16	18	20	22	24
45	—	—	—	—	—	—	—	—	—	—	—	—
28	—	—	—	—	—	—	—	—	—	—	—	—
21	—	—	—	—	—	—	—	—	—	—	—	—
14	—	—	—	—	—	—	—	—	—	—	—	—
7	—	—	—	—	—	—	—	—	—	—	—	—

W. AUSTRALIA — FAR EAST

0	2	4	6	8	10	12	14	16	18	20	22	24
45	—	—	—	—	—	—	—	—	—	—	—	—
28	—	—	—	—	—	—	—	—	—	—	—	—
21	—	—	—	—	—	—	—	—	—	—	—	—
14	—	—	—	—	—	—	—	—	—	—	—	—
7	—	—	—	—	—	—	—	—	—	—	—	—

NOTES

FEDERAL QSL BUREAU

Further to the par in Sept. "A.R." seeking information on QSL arrangements for certain VK0 Calls, add these additional: CH, CX, IN, JC, NL, NT, NC.

For family reasons, Joe Collier (VK9HC) had to return to W.A. from Cocos Island soon after commencing Ham activities. Joe has sent cards to those stations contacted and requests QSLs for VK9HC to be sent to him care Cable Station, Mosman Park, W.A., or via the VKS Bureau.

Recent overseas changes in QSL Bureau addresses include—KH8: John Oka, P.O. Box 101, Aiea, Oahu, Hawaii; W/R2: P.O. Box 666, Hillside, N.J., U.S.A.; CR7: Box 1234, Beira, Mozambique; VS1: M.A.R.T.S. Box 777, Singa-

apore. On the occasion of the 25 years existence of the association Bremen in the D.A.R.C., a VK9XBR Diploma has been established. VK licensed Amateurs can qualify for the Diploma by contacting three Amateurs in Bremen, using any recognised band, either c.w. or phone. Contacts to be made since January 1, 1959. Enclose 10 L.R.C. with application, to Adolf von Hahn, DRATV, WXR, Manager, Rechtenten Straße, 25, Bremen, Germany.

Eric Trebilcock (BERS-185), Acting Manager.

* * *

FEDERAL AWARDS

W.I.A. OFFICIAL LIST OF COUNTRIES FOR DXCC PURPOSES

Vide September '60 "A.R." Mauritania and French Federation formerly part of Fr. Africa were given separate listings from 20/6/60. The remaining four States of Fr. West Africa (FWF) and the four States which comprised Fr. Equatorial Africa (FEQ) have since become independent and will be listed separately from the relevant dates as under:

Formerly Fr. West Africa, now:—

Dahomey Republic—1/8/60.

Niger Republic—3/3/60.

Volta Republic—5/8/60.

Ivory Coast Republic—7/8/60.

Formerly Fr. Equatorial Africa, now:—

Chad Republic—11/8/60.

Central African Republic—12/8/60.

Congo Republic—15/8/60.

Gabon Republic—17/8/60.

NOTE—Congo Rep. referred to above is distinct from 9C05—former Belgian Congo.

French West Africa and French Equatorial Africa are now deleted from the Countries List. DXCC credits can still be claimed for these two listings on confirmations for contacts made prior to the independence of the areas concerned.

COUNTRIES LIST FOR VK-ZL CONTEST

Re the VK-ZL DX Contest, 1960, the rules provide for the A.R.R.L.'s Countries List to be used for scoring. For the purposes of this Contest the W.I.A. list may be considered identical to the aforementioned with the exception of Canton Island credits—A.R.R.L. allows both KB6 and ZL.

—A. Kissick, VK3KE, Awards Manager.

* * *

NEW SOUTH WALES

Activity within the Division has maintained a high level over the last two months. So much so in fact, that your correspondent was caught "behind the date line" last month. And now to a resume of Divisional activities.

The month of July will be remembered by historians as the beginning of a new era in amateur radio in New South Wales. The monthly meeting was held at the Divisional Headquarters located at 14 Atchison Street, Crown's Nest.

The meeting, under the chairmanship of the President, Bill 2YB, was attended by some 100 division members and visitors. The "A.R." however, states that the meeting was emphasised by lectures and informal social activity with a minimum of business. The most important item on the business agenda concerned the development of the property. Members were

enthusiastic for the Council to proceed with the development of the building and a unanimous vote authorised the Council to spend £4,000 on extensions to the building to provide a meeting hall, dispensary storage, kitchen and toilet facilities.

The lectures for the evening were delivered by Leon 2AOJ on "Oscillators," and 2AC on "Oscillator Stability in Receivers."

During August several new appointments were made, particularly in respect to Disposals. Alex 2ABK and Harry 2AJZ were re-appointed to the Disposals Committee, increasing the strength of this important sub-committee to five. Other members of the Committee are Keith 2ABK, Norm 2ALJ and Barney Smyth.

The August meeting was held at Science House, with some fifty members attending. The lecture for the evening, entitled "V.H.F. and Microwave Equipment and Techniques," was delivered by Mr. Harrant of the P.M.G.'s Department to an interested, but somewhat sparse audience.

The business portion of the meeting was highlighted by an interim report on the architectural plans for the Atchison Street building. The initial estimate of cost was reported by President Bill to be inadequate and after discussion it was decided that the Council should spend a larger amount than previously voted.

At a subsequent Council meeting more detailed plans were sighted by members of Council and at the time of writing these notes, the plans are being further discussed with the architect by President Bill and Phil 2ER. See you again next issue.

HUNTER BRANCH

Barry Goodman, VK2ZAG, was the lecturer for the month of August and gave an interesting talk on the construction of various capacitors with a bit of u.h.f. gear thrown in. Exploded samples were distributed for examination. Don't know in what condition Barry arrived back in Sydney, someone let it out that it was his birthday the following day.

Those fortunate to be present were VK5 2AKX, 2ZL, 2AYL, 2RJ, 2ZDF, 2ZCU, 2ZNW, 2FX, 2ZJR, 2CN, 2XT, 2CS, 2SF and 2AQR. Associates in attendance were Sutherland, MacLachlan, Davis, Bailey, Finch, Stebbings, Finlayson, Gray, Pearce, Temple and Webster. Quite a good roll-up considering the bitterly cold weather. My records show that President

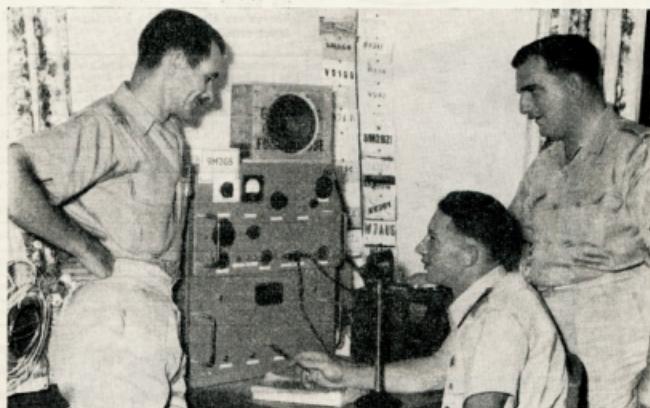
Lionel was there—we did hear his voice coming from a great heap of rags but no one saw his profile. However it appears that the local newspaper cartoonist was there, and saw him.

Keith 2AKX put on a tape he had of the A.B.C. news item concerning a school hook-up in which he and Grahame 2VU took part. One outside the Hunter district who also took part were VK5 2IN, 2AXH, 2DE and 2ATQ, which meant that the following schools took part: Booragul, Singleton, Long Jetty, Terrigal, Gundagai and Goulburn. At the meeting it was resolved that the fine job done by Keith be placed on record.

At the time of writing, Varley 2SF is on holidays and has been working on his 5-watter near Newcastle. Don't know how these bands are able to get away by themselves. Hope he gets away to Tasmania as there is an x-cess terror there who cuts power lines by flying a kite. What were the two arms of the law doing at Merv. 2MW the other day? Must be a duffer around there. Congrats to the members who took part in the Army exercises, believe it was quite a success.

The R.D. Contest went off with a bang but isn't it a pity that those who have social skills and the ability to get along with others don't come along. Heard one joker declare in one week-end a year. Heard one joker declare on talk for ten minutes without once taking a deep breath. No doubt you heard a couple of quinines before contest. The one chap here says that he had never heard the band so quiet. What an anti-climax he experienced. One wonders how long the powers that be are going to allow a couple of Amateurs who carry on ad nauseum on Sunday mornings. They are old enough in years to realize that Amateur Radio is at a cross-roads and a lot of heliocentric drivels could do a lot of harm.

Les 2RJ, despite many warnings from those who know, has been and done it and for a time at least a good man has been lost to the Amateurs. I hope they always come back, anyone congratulates Les, Harold 2MIA, is quite a stranger these days, has been seen erecting a t.v. antenna. Sputnick is now in orbit in a new Rover—the Water Board must be paying its way. Stuart 2ZDF nearly finished re-building his shack using l.t.v. even with cold valves. Bill 2XT, when not being mine host at the social monthly gatherings, is too



Fl/Lt. Keith Avery, of Brisbane, Qld. (left), watches with Cpl. Ray Pulford, of Greensborough, Vic. (right), as Flying Officer Ron Johnson, of Bondi, N.S.W., works his radio set. All three men at R.A.A.F. Butterworth are Radio Hams.

TYPE 65

General purpose with low frequency response suitable for lively halls.

TYPE 66

P.A. use where less low frequencies are required than the 65 with a lift in the middle frequency to ensure high output without feedback.

TYPE 67

Communication use, has a further reduction in low frequencies than the 66 and increase in high frequencies for intelligibility through noise.

THREE INDIVIDUAL TYPES IN THE FAMILIAR "65" CASE

Available in Low (M.D.)
50 ohms, and High
(M.A.) Grid Impedance.



Retail Price including Sales Tax

Type 65 MA	£11/0/7
" 65 MD	£8/19/0
" 66 MA	£11/3/6
" 66 MD	£9/3/0
" 67 MA	£11/3/6
" 67 MD	£9/3/0

ZEPHYR PRODUCTS PTY. LTD.

58 HIGH STREET, GLEN IRIS, S.E.6, VICTORIA

PHONES: BL 1300, BL 4556

A Brand New Range of...

REDUCED IN SIZE
LOWER IN COST...

ELECTRONIC
A & R
EQUIPMENT

FILTER CHOKES

This range of chokes has been designed to reduce size and cost by the use of the highest quality materials.
The values given for the inductance with rated current are applicable to condenser input conditions.



Type No.	Inductance at Rated Current Henry's	D.C. mA.	Resistance Ω	Maximum Direct Working Volts	Weight lb. oz.	Mounting Type	DIMENSIONS BASE		
							Mounting	Overall	Height
3040	12	100	290	600	1 7	SCL 22	3 1/4	3 1/4 x 1 1/4	2 1/4
3041	12	125	275	600	2 0	SCL 22	3 1/4	3 1/4 x 2 1/4	2 1/4
3042	12	150	205	600	2 6	VLN 25	2 x 3 1/4	2 1/2 x 2 1/2	3 1/4
3043	12	175	185	600	3 3	VLN 25	2 x 2 1/4	2 1/2 x 3	3 1/4
3044	12	200	165	600	4 4	VLN 31	2 5/16 x 2 1/2	3 x 3 1/4	3 1/2
3045	10	250	130	1000	5 2	VLN 34	2 1/2 x 2 1/2	3 1/16 x 3 1/2	3 1/2
3046	10	300	90	1000	6 11	VLN 34	2 1/2 x 3	3 1/16 x 4	3 1/2
3047	5-15	250-50	70	1000	5 4	VLN 31	2 5/16 x 3	3 x 3 1/4	3 1/2

FOR FULL TECHNICAL DETAILS
SEE YOUR NEAREST
A. & R. DISTRIBUTOR!

OR

A. & R. ELECTRONIC EQUIPMENT CO. PTY. LTD. 378 St. Kilda Road, Melbourne, S.C.T. MX 1150, MX 1159

busy making money for another holiday. Must be going to Macquarie Island this time as he has been everywhere else. Harry 2AFA now going strong and practically recovered from his indisposition. Remington 2BZI has it that another Harry 2AFX is giving away tv sets and "B" class broadcasting and going into a chip joint. A certain famous disc-jockey has already compounded a slogan "Harry's chips" very on flavour.

Plans to hear that Jack Hamilton is back with Ron 2ASJ, even though his voice was still woggy. Next time you catch the golden staph, hold on to it for a while. Jack, as I believe the G-boys are onto a sure cure. Ask Tom 2TQ and his a.s.b.

Last month the transmissions of 2AWX were carried out under better conditions with the assistance of 2AYL and 2SF. It is very hard to get into Secretary Gordon's shack these days what with literature and correspondence from all over the world. As usual Gordon is doing a good piece of hard work—don't know how Ads puts up with it.

At present, Bill 2ZL is not worth two bob on the air, being almost at the point of no return trying to find out why a certain piece of test equipment that he paid £10 to be repaired, hasn't worked properly. Don't you hear that a certain Lady Amateur listened to a foreign interloping station for a while before she discovered that it wasn't VK2ZL calling CQ? Stan 2AYL operating 2AWX portable the other night was after call-back on the air but didn't hear him go on. Ron 2ASJ, now a victim of t.v.i., is no longer on the 2AWX call-back, so don't look for him after 1800 hours; hope it can be cleared up, Ron.

Well chaps you will have practically a fortnight to get over the October festivities before the next meeting which will be held on the 14th, and with the weather containing the spring feeling there should be no excuse for not being at the Bill Hall's hall on the 26th. Come along and have a natter and a game of billiards—no entrance fee.

CENTRAL COAST ZONE

The Central Coast Net on 3635 Kc. at 8.30 p.m. on Monday nights continues as usual, sometimes with as many as 10 stations joining in. Gen 2AII is now working with a 122 set. It is definitely not true that he is operating from the smallest room in the house, in fact he is active from the kitchen and is building himself a shack before commencing on the gear. 2AR is active on most bands and when not building something c.r.o. or a tape deck amplifier 2AII has now worked dozens of DX stations on his comical quad. This monster is designed for 29 mx and is about 42 ft. high, being mounted on a telescope tripod. His transmitter at present consists of a set of footpads.

Bert 2AAG is active on 80 mx phone using a 122 set from Avoca, also as 2AAK from Kulmura. These locations are 33 miles apart. The latter is his mountain retreat and here battery power is supplied by a 12V 100Ah. He controls his of 17 knob receiver. Your scribe has been promised a twiddle on his next visit to Avoca Beach. Ken 2AII who recently licensed is using an ATBR from Pest's Ridge and is active on 80, 40 and 20 mx. Ken is complaining of poor signals on 10 and 15 mx, he still works ZLs on 80. Wally is building a 56 met tax using an S29B, having fun in taming this bottle. (How about an article for "A.R."?) A new 36 met oscillator is being planned. 2IN is active on 40 mx from The Entrance; very pleased to see him at the Club meetings. Trevor 2TM is building some simple gear for 56 mgs. He still uses screen modulation on the 814 on 80 and 40 mx. A larger power supply for his home 2PI is also planning some 36 met equipment.

2RU, 2AVJ, 2AMU and 2MV not active due to various reasons. [Amateurs are permitted 50 Mc. 2RU is based on Mondays using 122, 2AVJ on Tuesdays on 80 mx.

The Gosford Radio Club now has 10 licensed members who have graduated in the three years since its formation. The latest ones are

Frank Jarvis and Les Lackey who are waiting for their call signs.

2AI is still heard on 80 and 40 mx on suppressed carrier. The writer, 2DN, is very pleased with the 8125AB linear for sideband and when installed is extremely well-behaved. This is now preceded by two 6AG1 linear, the first in Class A and second in g.g. Lookout for 2AFY on Thursday, 13th October, operating from the Gosford High School Science Exhibition. 80 and 40 mx operation is planned.

ST. JOSEPH'S TECH. SCHOOL RADIO CLUB

Since the arrival of club license, 2ATQ, on 10th July the boys had about 70 QSOs, averaging two per school day. Ten Interstate stations were worked in R.D. Contest and we had had seven DX contacts, chiefly W and ZL stations.

First entry in the log has a detailed description of a certain "premier fishing resort" in the remarks column. Hope the youngsters do not believe everything they see on TV.

Chief operators are Mike, John and Tony, the first two handle c.w. well, and are collecting quite a batch of QSLs. Thanks to all those chaps who sent us their card direct. Fifty cards have been sent out from the club station, and only two of these went to s.w.l.s.—any reports will be acknowledged.

Operating hours are still about 1.0 and 4.0 p.m. on most week days, so give the boys a call. Don't hesitate if it happens to be 20 m...VK 3KJ is as welcome as DX.

The club tx is a new Gledhill 104 to 897 by Bert 2IN supplied many parts for this compact multiband rig, including crystal mike and meters. Receiving was a problem until 2ZLM came to our rescue with a Philco 100. Now we are working on another rx and are able to lend the spare one to young members for a week at a time. The same system is followed with spare audio oscillators for c.w. practice.

The boys are working alongside the blackboard in school, and the class have had several interesting talks followed by question sessions. Wal 2AZH, Col 2ASF and Huo 2WH were very instructive on various topics.

Recent visitors were Sid 2SG (mobile) and Alan 2ASJ. Both are working on mobiles also called in, and my sympathies are with them because I can't now remember the call sign.

So 73, and c.u.a.g.n. sn. de 2ATQ.

VICTORIA SOUTH WESTERN ZONE

Advice has come from VK3 PERTH Division that following the recent request by Divisional Headquarters to use the 160 m band for W.I.C.E.M. work, this band may be used subject to the proviso "for emergency use and practice only". There is no time limit or restriction on the stations who may use it and the zone members are charged with the responsibility of policing this proviso mentioned above in our area. This permission does not prohibit any emergency work in the other bands. It is not often we get a bit more than we ask for these days!

Last month comments were invited about complete operation. I think our President fills the dipole. Any explanations? Wally's hammonia Keith is doing some L.B. transmitting and has heard all but ten or so of the broadcast stations in the continent. Fair effort indeed considering the shared channels. Tim 2TW has the s.s.b. working nicely on 80 mx now using an A.R.S. generator to a B13 ZL linear. The object is 110 m and he has done this during the solar cycle. A newcomer to the bands, but an old timer in electronics, is 2AAK/AAG. Alec's QTH is Avalon Beach except when on the farm at Kulurna and is one of a very well known Warrnambool family at which place he was born. John 2AJR has formed the shack for the lure of the rod and line. Can't quite imagine why, for both pursuits could be followed here without leaving the shack. Dale 2AJT and Elizabeth 2JZT have combined forces to build a shack and are using a SA5Q modulating a 6AQ5 with 2.4 watts input on 80 mx and putting in a nice sig. Too many thanks to those who passed on the gen, but a further request though; what gen from Ballarat way?

Many zone stations put nice sigs up to VK4 in the evenings, and I think that the loaded whip, too! The band seems to be rather deserted up there, but 40 mx on the other hand much more populated and not so noisy. The mid-morning s.s.b. net was fine copy anywhere, but VK3 phone stations were not available until the afternoon when some nice QSOs were made.

George 2AOQ has fired up again on 80 mx and here's hoping that familiar call stays with us again, now that business worries have eased a little. Remington 2BZI has just christened at 2GDN QTH! A wedge-tail cycle east of the Infirmary the other day and John is still talking his insurance company over. Seems that the policy doesn't cover airborne operations! John has taken up arc-welding now, but this has nothing to do with the aforementioned incident. He just likes to be "prepared". Have you thought of what to do when Tom starts to mend something when you are in QSO? John, who is a District Commissioner of Scouts, has been approached by them to co-ordinate efforts in the Jamboree-on-the-Air of which mention is made elsewhere.

Another O.T. to reappear is 2DD whose 7 mx sig. on Moomba Lookout was f.b. However my

sig. must have been some other place but Hamilton. The municipal elections brought Doug 3KJ back for his fourth term as Mayor of Colac. Nice work Doug, and here's hoping it won't be so arduous to leave no time for the CC committee. Chris 2XUL is very busy now that the big rig has GRO. Chris' eagle eye noted the latest slug the fates have dealt us in the form of the new sales tax on tubes. Formerly all tubes bore an excise of 2/8 each. Now this has been replaced by a 2 per cent. tax, which will make the lower power transmitting tubes quite a bit more expensive. Exceptions are picture tubes and the high power tubes which we don't use. What about some cheap shapes?

Tom 2D. Contest has some rare ones on the band. Brian 3XKN made a nice little tally in a short time without a Q.C. Bill 3XE worked very hard for his 119 contacts. Seems that Bill can hear them and others can't for each contact was followed by a score of stations wanting to work the same outstanding sig. In the Contest was Tony 3WB. Welcome Tony, and please didn't you hear me call you from Pialba on c.w. on the whip in the middle of the QRM?

Bob 2KJ has now moved to Werribee and should be about again soon. We're missing you on the hook-up, Bob. You're still in the zone you know. Kerry 3AXT has come up and looking good. We wish him best of luck with his new project. Peter 2PZ has come up to us some more about that antenna of yours that works so nicely on 20 mx. Was it a triangular ve beam or delta shaped folded dipole or how can one describe it? Talking of exams, Lindsay 2M has been successful with his A.O.L.C.P. and is now aiming at passing the morse test next month. While at Warrnambool we find Eric 3ANQ using 15 mx and 6 mx to rake in the JAs and occasionally comes up to 40 mx. Peter 2PZ has also made his debut on 21 MC. He's right up there on other mags, too, and is subsumed in the DX bug. Gordon 3AGE makes a late appearance on 80 mx now and then with the AT2RS from the bedroom.

There has been rather quiet at this QTH after the mobile operation. The new 29 m coax converter has been completed and I spent a couple of futile hours persuading it to produce a signal before realising the band was completely dead. Later it came to life and produced a few country hams, now I'm not surprised! Did anyone else hear that T3 FSK sig. on about 3555 Kc. on the 6th about 2000 hrs.? He was calling "ZSC?" and signed himself ROP52. On the telephone bloke calling a number I didn't identify.

Had a run from Wally 3UT on one of my 80 mx mobile contacts from VK4 one evening. Rendable 5 on his vertical antenna and nil on the dipole. Any explanations? Wally's hammonia Keith is doing some L.B. transmitting and has heard all but ten or so of the broadcast stations in the continent. Fair effort indeed considering the shared channels. Tim 2TW has the s.s.b. working nicely on 80 mx now using an A.R.S. generator to a B13 ZL linear. The object is 110 m and he has done this during the solar cycle. A newcomer to the bands, but an old timer in electronics, is 2AAK/AAG. Alec's QTH is Avalon Beach except when on the farm at Kulurna and is one of a very well known Warrnambool family at which place he was born. John 2AJR has formed the shack for the lure of the rod and line. Can't quite imagine why, for both pursuits could be followed here without leaving the shack. Dale 2AJT and Elizabeth 2JZT have combined forces to build a shack and are using a SA5Q modulating a 6AQ5 with 2.4 watts input on 80 mx and putting in a nice sig. Too many thanks to those who passed on the gen, but a further request though; what gen from Ballarat way?

UNIFORMS DUST COATS

for your Office Staff, Factory, Workshop, Servicemen.

★
Bowls Frocks, Tennis Frocks,
for the retail trade.

★
D. MILBURN & CO.

3 Railway Avenue, East Malvern,
S.E. 5, Vic. Phone: 211-3131

CONTEST CALENDAR

Oct.	1-2-VK-ZL, phone.
"	8-9—c.w.
"	22-23—Boy Scouts Jamboree
"	28-30—"CQ" WW DX, phone
Nov. 25-27—	" " c.w.
Dec. 3-4-R.S.G.B., 21/28 phon.	

MOORABBIN AND DISTRICT RADIO CLUB

This last month has been marked by an increase in membership. Our activities, both social and technical, are varied and seem to fit in with the other activities of our members which make for interest and smooth running. The Crazy Whist nights have been well patronised as are all our other social events. Not quite so the last tx hunt, but weather plays a big part in such an event, and it was a cold night. The October meeting will be better though, for we have promise of more starters. It will be held on the evening of 12th October.

One activity which may have been overlooked by Amateurs other than members, perhaps because of lack of publicity by us, is the "Honorary Membership" certificate issued by the Club. This has been the latest certificate to Allan VK3AKZ, who has complied with the rules and won himself the honour. A few notes re this may not now be out of place. Quoting from the rules:

Object: The object of this award is to promote interest in and friendship with VK3 certificates. There are many active transmitting members of the Club. Ask all VK3 contacts: "Are you a member of the Moorabbin and District Radio Club?"

Rules: 1. To become eligible for the award, Australian mainland stations including VK7 must contact by radio fourteen member stations currently financial at the date of contact.

2. Overseas stations including VK3 and VK9 call signs must contact by radio five member stations currently financial at the date of contact.

3. The Club station VK3APC may be regarded as a financial member station for this purpose.

On completion of the required number of contacts, the applicant must forward to the Certificate Officer any suitable means a set of the call signs of members contacted, together with the times and dates of contact and his own correct postal address.

After verifying with the logs of the name-contacted stations, a Certificate of Honorary Membership will be awarded and forwarded by post.

6. If the required number of member stations is contacted for a second or subsequent time, a further award may be issued. This will take the form of an emblem for attachment to the Certificate. Stations named for

such an award must not include those already named for a previous award.

7. Honorary membership will allow all the privileges of full members of the Club, less the counting of contacts with Honorary Members for the award of this Certificate and less the power to vote.

8. This award is not available to financial members of the Club. Station operators who have been financial members must have signed their membership in writing prior to the date of any contacts named for the award of this certificate to themselves.

9. Rules and conditions of this award may be amended by a motion of motion one month prior to being put to the vote at a regular meeting of the Club. After being passed by a majority of members present, the amendments will come into force.

10. The address for certificate correspondence is: Moorabbin and District Radio Club, 17 College Grove, Black Rock, Vic.

QUEENSLAND BRISBANE AND DISTRICT

Well, at the time of writing this article, our Secretary, Stan 4SA, has been gone two weeks on his grand tour of the north. He sent a long letter from Townsville, and though it should be in my pad, 4RW's writings, he will get back to me as soon as possible. 4RW is putting up a tower and Ted, feeling more at home in a speed boat than on a tower, enlisted the support of Bob 4MF. Bob, a lot younger than Ted, was taking some risks and Ted was in great trepidation, let me tell you, at the climax when he extricated a rather risky manœuvre and Ted exclaimed, "Bob, for goodness sake be careful," and grabbed Bobbie around the waist. Bob, a bit ticklish, said coyly, "Ted, control yourself, they don't know about us yet and might remove him from Ted's amorous embrace." That story is in Stan's own style of telling "good 'uns" and I hope you get as much of a kick out of it as I did.

I recently had a long discussion with Mr. Farr, of Warburton-Franklin and he told me that he will be soon sending a copy of the Heathkit you want to buy. He will be sending Heathkit circulars to all the W.I.A. members

in Queensland so that you can decide what you want to buy.

In the September "A.R." there was an item regarding the theft of gear from two members in Victoria. One was our Federal President, Max Hull, and I hope that you will be careful if someone you don't know, tries to sell you any gear.

One of our members, Ian 4MO, is going for a real wonderful journey. He is going to New York by way of London by Boeing 707 to do a Research Scholarship at the University of New York. He will visit R.S.G.B. headquarters in London and A.R.R.L. headquarters in West Hartford.

For many years our audit has been done very efficiently. Mr. Dick Hume and everyone just loves it for granted. Well, recently Stan brought Don's work up at a Council meeting and suggested that he be made a Life Member of our Division for the wonderful job he has done for us. He was approached and asked if he would like to have a membership of the Division. Believe me, gentlemen, we should thank our lucky stars that we have such a willing helper; strangely enough, with six years on Council behind me, I know the work Don has done and I, personally, welcome him to membership.

With the extra job of Acting Secretary on top of President's position, I don't seem to have any spare time these days and, though I had four years as Secretary, it's really a job and a half. So I'll QRT now and hope to have a lot more news next month.

TOWNSVILLE

Congratulations goes to Claude 4UX as he has now six of his class of eight with the limited Z call sign. He has another class going but this time the aspirants are shooting higher, going for the broadcast and commercial tickets. Well Claude, hope they all make it. Thanks and go to George Peterkin who allows the class to use his workshop with all the latest test gear including t.v. equipment. George is in the radio retail and interested in TV, DX and listens to the 30 Mc. boys when conditions are good.

Claude and his shadows intend to bring Amateur Radio to the notice of everyone in their district, besides getting good publicity in the local daily paper. They are putting

NEW BOOKS FOR RADIO HAMS

The Radio Amateur's Handbook 1960. The standard manual of Amateur Radio Communication.

A.R.R.L.

Panel Signs—Permanent Paint Transfers—Three Sets:

1. Receivers and Amps.; 2. Test instruments;

3. Panel Words

6/6

Ham Radio Handbook—By Electronics Illustrated	9/6
R.C.A. Receiving Tube Manual, New Edition	13/6
R.C.A. Transmitting Tube Manual	15/-
Philips Valve Data Book	19/9
A Course in Radio Fundamentals	18/-
Single Sideband for the Radio Amateur	25/-
The A.R.R.L. Antenna Book	31/6
The Mobile Manual for Radio Amateurs	40/-
The New "CQ" Mobile Handbook—Wm. Orr, W6SAI	37/3
Surplus Schematics Handbook, from "CQ"	27/-
V.H.F. Line Techniques, Gledhill	24/6
Radiotelephone License Manual—Editors and Engineers	58/6
101 Ways to Use Your Ham Test Equipment,	
H. W. Sams	27/-
R.S.G.B. Amateur Radio Call Book 1960	7/6
How To Improve Your Short Wave Reception	23/6
Global Time Conversion Simplifier	11/6
Short Wave Receivers for the Beginner	10/-

NOTE! All prices quoted include postal and packing charges.

Technical Book & Magazine Co. Pty. Ltd.

295-9 SWANSTON STREET, MELBOURNE, C.I., VIC.

Phones: FB 3951, 3952

radio exhibits in the Education Week display and Back to Airdale Week, so their classes will expand. The boys also journey to Townsville each month to attend the local club meeting, 150 miles round trip (keep, eh?).

Here this appears in print, Graham 4BX will have sat for his R.I. exam, and all the gang will you all the best with it.

Donnie 4ZDR now on 50 Mc. has cracked the DX band in Hawaii and Japan, but now hopes to work other V.K.s and puts in a lot of time listening. Basil 4ZW came in for a visit and pitched his tent on the spare allotment and visited most of the locals. Took Nick 4WV to Rivers Towers to see John 4KX who had just took Bob 4RW up to visit all the Z boys there. Bob 4MF has been on a walkabout, heard his portable down south causing grave QRM to Herb 4KM, signals were not always the best here due to changing conditions.

Stan 4SA, the Secretary of the Queensland Division of the W.L.A. arrived here on the Monday. After spending a day or so in Mackay earbashing the boys said to have Shanghaied John 4PZ into the last boat to leave. He arrived at Claude 4UX's at Ayr on the Sunday afternoon and stayed the night. Jess, Stan's XYL, had put in the day catching fish for Stan's breakfast. "How lucky can you be?" Stan took the opportunity to show off his second hand portable to the W.L.A. views to the newcomers to the band.

He will stay in Townsville a fortnight and contact all interested bodies of the town and explain the hobby of Amateur Radio to all visitors, besides giving a talk at the local radio club and will also explain our part in W.I.C.E.N.

On his visit to Cairns he will again catch up with Bob 4RW, who is on a three-months' tour and make the necessary arrangements journeying to Atherton on the Tablelands to meet the gang there. On his travels, he will hear complaints and kudos of the W.L.A. and in his usual charming manner will carefully shoulder all their troubles and readily come to their rescue. His XYL I hope enjoys her holiday, but take my tip and see he shows you all the beauty spots. You have waited a long time to see our beautiful North.

That Chas. 4RQ has promised Frank 4ZM he will supply news of DX heard each week before the news session on 4WI.

Bert 4BP, Darwin bound after tripping around a North West Queensland, was up to a good rock top on 4WI, carried by a single wire antenna with a trailer. The portable rig did a grand job when I heard it from Mt. Isa. 4SM, an old timer, looked real well when I visited him the other day and likes to talk about the olden days. On a recent visit to Morsman with Basil 4ZW, called on Harry 4OM and found him in a new job, no doubt early mornings on the milk run, has set up in the radio business and doing well. On the way home stopped at Palm Beach to admire Ted 4MH's beach house—aptly named "Seaside."

SOUTH AUSTRALIA

The monthly general meeting of the Division with the most on the ball, to wit, the VK5 Division, was held in the clubrooms to a capacity audience, all of whom were interested in hearing an exciting and rewarding one from a technical angle as well. The night took the form of a display of members' home-constructed apparatus and the display excelled itself, both as to the number of entries and to the superb quality of the exhibits. Al 5ZCR was the winner of the receiver section. Barry 5BZB won the transmitter section. Cyril 5DY won the section for associated Amateurs gear, with a beam indicator using transistors (the same piece of gear that the Editor has written about). Some bodies kept last month in the magazine, for an article on; John SJG won the instrument section with a 5 inch c.r.o. and last but not least, Gil 5GX won an award with an all-band transistorised transceiver, which made quite a healthful water cooler.

Excellent apparatus was also displayed by many others. Bob SZFG had a 288 Mc. xtal controlled transmitter. Neil SZAW had a micro-match, 5CN had a 288 transceiver, SZGP had a 288 Mc. transceiver complete with G4ZP aerial to match, and Mr. Edmedes had an unusual gimmick, which was a speaker cum headphones cum speaker cum headphonescum-speaker, well anyway, it was a good gimmick, you will agree. Carl SSW displayed his modulation checker and the SLL brought along his newly constructed Heathkit transmitter and v.f.o. for all to see and envy.

All and all, it was an excellent night and must have been well rewarding to the pro-

gramme committee for persisting with this type of display after the somewhat poor results achieved last time. Once again courage of their convictions paid dividends.

Very little general business was transacted, and apart from the somewhat delayed ratification of the Special Easter Convention minutes, the meeting was almost business free. The hurriedly jammed were broken up at the winding hour of 11 p.m. and with the farewells of the members lingering in the ears of the Chairman, Lloyd 5OK, he whipped up his horse and buggy and clippety-clopped sleepily on his way to the backlot of Lucknow. We have had no confirmation of the fact, but it is assumed that he made it in one piece, but roll up to the next meeting and find out for yourself.

In this blessing to report that the Division had great success this month, both in the press and radio. The Chairman and President did an interview in the paper on the Project Peace and the Amateur Station which will be published next week. In our section we had an excellent write-up in one of our members (Brad Booth) who is leaving the State Police Force and journeying to Canada to join the Mounties, mainly because of his association with Amateur Radio. The Gordon 5XW was in and out of the papers daily in connection with the aluminium balloon and Moonwatch, so much so, that two separate people, not connected with radio, were heard to remark that apparently Amateur Radio was getting quite a bit of press. Naturally this reflects great credit upon the Divisional publicity officer, although when I took on the job I was quite prepared to work hard!! Roolity tooty too! If I don't blow my own trumpet, who will? (I do it myself—John 5JW).

George 5DZG apparently still happy with 7 Mc. judging by his enthusiastic approach to all contacts. When caught here he was calling and calling a VK3 mobile, and finally got him to the mutual satisfaction of both sides. Frank 5ZM is getting into these notes with the monogram of the word "SAX" on his card, but only because he seems to be in trouble each month. First it is his arm, then his burns, and now he has cut his hand. I would like to take a ticket in Tatts myself. Carl 5SS is having a little time on his hands to engage in a new version of long-distance Gordon 5XU now and again does a little theoretical investigation for Carl, so Carl is now doing a little metal work for Gordon. The perfect set-up if it might be permitted to say so. I am not permitting 5KX to hear that the birds lay square eggs Carl, and all say OOSH!

I always endeavour to keep any reference to the v.h.f.'s out of these notes, in deference to the v.h.f. scribe, hot hum! but my type-written recouled in horror at my last listening to the v.h.f. on the W.L.A. on 7 Mc. when Al 5ZCR said that the v.h.f. boys should bring along some equipment to the coming monthly meeting, and show the low frequency boys some things that they have probably never seen before!! How smug can one get! I have never seen a v.h.f. before in my life, this is the first time that I have met up with it. Al, my boy, could you have been poking mud at the tall grandpappies. Fie upon you, and a couple of fiddle-dee-dees.

Col 5XY heard in his usual Sunday hook-up with the gang words to the effect of "the crays!" John 5JW words not mine and also mysterious references to "Splatter," apparently a publication that Col was interested in, to say nothing of frogs' legs for experiments and Q multipliers. The ground covered by these two topics was quite interesting. Gordon 5XV used a 250 watt amplifier in the University procession and worked so hard and long at it prior to the big day that he spent the big day in bed, night unto exhaustion. I understand that he was testing it all around the neighbourhood, see the shop and the houses, windows would stand up to it, and had no casualties. If he cared to write to me I can give him an asbestos copy of the various remarks from the neighbourhood.

Les SLC on 7 Mc. in contact with John 5JW gave the gang words to the effect of "GEM" an electric drill library. John was only using 8 watts and was also in trouble with 33,000 power mains. Les said that he would have to locate the user of the drill and tell him to use a filter, and from my personal observation of the other end of the line, I mean Argus, the point with him would be equivalent to looking down a lion's throat and asking the lion to say "99, if you get what I mean. Have not seen or heard anything of Don 5MD or Carl 5XW since the Northern tour trip down to VK2 and the capital city. Did you see any reference in Parliament to their visit, nor to any disturbances, so apparently Cee behaved himself!

Rex 5DO heard on 7 Mc. discussing that dreadful topic t.v., with one of the wise men from the East. When the topic graduated to color t.v., I got off at the next stop with the feeling that my bread and butter was in danger. Please boys, consider my feelings a little. Bill 5CS was another one on the Mc. talking about t.v., although in this case he was only saying that his mother had recently secured a set and what a boor it would be to her. Football also came into the discussion. Bob 2RG (ex-5RG) is at the moment back in VK2, working on a quick t.v. course to keep in touch with modern practice, and also renewing old friendships. Has consented to give a talk at the next meeting on VRB's land.

Tube 5NO heard on the W.L.A. call-back describing a DX station heard as of "doubtful legitimacy," and with the chuckle that followed this description, I am still trying to work out as to whether he meant the operator of the station. Comer 5ZB also heard on the W.L.A. call-back with the remark that you are not sure if he would use Single Sideband in the R.D. Contest. This I take as a gesture of defeat and a confession as to the inadequacy of s.s. when the pressure is on. I never thought that would be buckey. Comer heard such remarks, and also a proof that I can read his signal. I knew if I waited long enough he would convict himself out of his own mouth.

Wally 5DF is now well set and active from Leigh Creek, although so far no coal has been dumped at my back door. Heard him remark that he had heard the absence of the wind up there after all the wind he was used to at Port Lincoln. Give it time Wally, give it time. Les, Mahomet to you. SAX recently found a new station in the hamlet of Gawler. Brian 5ZDF was also present boasting of his latest, the snake support post. It won't be long before Gawler will want to secede from the city Division and form its own Division complete with Vice-Presidents, etc., etc. I will listen to the vice part anyway.

Don 5TM heard loudly, advising all and sundry to go to the beach on such a lovely day and get into the garden. In proof of the sincerity of his remarks he was heard on the air on 7 Mc. practically all day, which is solid support for "don't do what I do only do what I say." And 5XK, with a smile like the broadcasting station, was heard telling all sorts sundry that he had never used 180 watts in 3 years activity, and was not likely to start now. Well with that signal he was using 180 watts from Lucindale, or else a mobile outfit from the door. Come clean friend, what have you done to the rig lately? Pat 5KM was another one to come pounding in the other Sunday on 7 Mc. I don't think that I have ever heard him so strong as he was, I look forward to a local at last, and am quite surprised to hear him from Victor Harbour.

Although the Northern Territory is now VK8, it is still part of VK5 and it seems years since this column carried any reference to the doing of the game up there. Now it goes without saying that if no news is received by the end of the month, expect me to write about anything, however although I may be likened in some quarters to a shrinking violet, or should it be penny? I will stoop to any depths to get a mention about VK8. Regarding this in mind and in the local paper the week about householders in Darwin, I decided to take his dog for a little walk after sundown, and upon seeking the dog he found it standing fourfooted and snarling at something under the house. Peering under the house the householder was astonished to find a fair sized crocodile gazing intently back at him. Now the part of this paragraph that impressed me was the closing words. It simply said that the householder and the dog returned back to the house and considered the position. Now if he was not a real amateur I will eat my hat, only an amateur used to finding all sorts and conditions of gremlins in his rig or receiver would instinctively retire to consider the position. Well, wonder you earlier that I have stood any depth to get a mention of VK8 in the notes, did I not?

The August monthly meeting of the South East gang consisted mainly of a discussion of the doing of the R.D. Contest, and from all reports received everybody was well satisfied with their efforts. I understand that there was a record turnout, and after the meeting that he received at the meeting, he is still in sackcloth and ashes yet.

The most important and also pleasant news from the S.E. this month is that Pastor Ron Holmes has been issued with his call signs 5ZP and 5ZT for the R.D. Contest, but very acceptable nevertheless. Ron has his eyes on a tall tree in his neighbour's buck yard and has even obtained permission to use it for a support for the antenna. Diplomacy thy

name is Ron. Stuart SMS has one pole up but unfortunately was not able to spend much time in the Contest, but did manage to collect a representative score at that. Leo SGB is the aforementioned gentleman who arranged for his month. His arrangement prevented him from getting in on the Contest, but after his reception at the meeting he has decided to resign his job if it occurs again.

Clude SCE could only spare ten minutes which to say the least is a pretty good average. Tom STW was a very pleased man on the Sunday morning, at early hours, to contact a VK9 on Macquarie Island on 'Mac' New work. Tom, Erg RCU kept Mr. Gardner on the air and among the many first-timers during the Contest and also used his telephony technique when the adherents of Mr. Morse were slow in coming up.

Dave SMA is at the moment of writing on his summer holidays and is visiting Adelaide, probably renewing acquaintance with the city slickers. He is preparing his v.h.f. gear ready for the coming summer months and now has xtal controlled rx's and tx's for the 2 m and 70 cm and a 100 m band tuner into Mr. Gardner on those bands. Arch 5XK, who will now always be included in this section of these notes, and after all why not, it is his right place, although I know where his right place is, but the editor won't let me put it in. Arch was a quiet participant in the Contest, but did his share for the Division despite his unintentional snooze. Strange as it may seem, Arch has a wing up his sleeve, he is bemoaning the lack of VK5s on 80 mx, and finds the VK5s are so few that band 80 plus is a waste of time. That band is the usual huge salary! Col SJC has his 1 and 2 m converters covering OK and is re-building the 2 m tx. Is still keeping his average up on 40 and 80 plus acting as my espionage agent at the usual huge salary! The Hamadars at the meeting as Col says it was bitterly cold and they excused this time. Probably out looking for that tiger, maybe?

Mystery question for this month is who was the VK5 laddie who, despite the moans and groans of his XYL, got up at 2 a.m. on the Contest morning, contacted a couple of contacts, went outside to quieten the dog which was barking, locked himself out, and then had to wake the XYL to let him in???

News from the Upper Murray district tells of the retirement of the well known radio actor Tom 5TL (all autographs and photos obtainable through the office of his "Charity begins at home fund"), who not only had his bestest microphone go on the blink but also jammed his middle finger, left hand, in the door frame. He was unable to get out of the door, but the office staff have added several new words to their already extensive repertoire, or should it be repertoire. Latest information to hand is that he will continue to live!

Harry SKW has settled in at his new job in the city of Bendigo, although as yet no hint of his whereabouts. Except for you at the meetings now Harry. Need someone to help me to talk up, nobody even listens to me these days. Hughes SBC and George SGB noticed the other day delving into the innards of a radio that the other effects of which, at the moment, must remain a dead secret because my secret agent was told quite politely to be on his way as they could do a better job without him. Apparently his well-meant suggestion became a little too zealous.

Fred SMA has been out portable-mobile a couple of times during this month to keep his interest awake, and also to check with Tom 5TL that their 22's were moth and rust proof. Tom, of course, was the shrewd one. He stayed up until 2 a.m. to do the job, and when they proved that 80 mx was more reliable than 40 mx for their tests, although their 40 mx signals were heard a long way from the Upper Murray.

Two events of some importance occurred in VK5S this month, the first was the visit of Ken 3APJ and his charming XYL Joan. The first indication that I had of their arrival is our fair city was a telephone call at about nine o'clock at night telling me that I had better get up to see them tomorrow, and it was not until I was passing through Trafalgar Bend that I woke up to what it was, and somewhat sheepishly returned to Adelaide. They both came out to visit the Best Broadcasting Station in the land, and the ABC studios, and also made the tea for our supper. The grapevine was working by this time, and Joe SJO had dropped in, and a pleasant evening was spent by all. Ken and XYL came to lunch at my QTH on the Friday and with my XYL and myself here cold would just fit better to say nothing of my grandson half-way through the mumps, we lined up our forces against them. I am hopeful of receiving the news any day now that the entire Pincock

family are prostrate with either a cold or the mumps, or better still, both! I will teach them to trifle with me!!

The second event was receiving a somewhat unusual communication from my lawyer, the Editor which I have handed to my lawyer on the chance of a libel action. He tells me that he can see nothing wrong with it and suggests that I am suffering from a persecuting complex. But that as may, have now received a letter from Tom Hogan, Roy Higginbotham, and now the reigning Editor, dear, dear Mr. Cocking, and they are all along the same lines—to wit, don't talk so much, don't pad so much, in fact say what you have to say and then SHUT UP. Flattery will get them nowhere!

completing the necessary formalities and gathering unto himself some gear.

David TDA has gotten away to a flying start and has his wife using the 80 m dipole on 20 mx. Ellis 7WA is busy putting the finishing touches to his rx to end all rx's. (How about details for "A.R.—Ed.) Sam TSM is progressing with the new final and is still putting the finishing touches on the 80 m gear unit. Kevin ZAH hasn't got his 2 mx gear functioning as yet, I do believe he is displaying YL interests at the moment which naturally restricts Ham activities. Max TMX is, I understand, showing tendencies towards native peak clipping; best of luck Max, and we hope nothing more than the negative peaks get clipped.

HAMADS

1/- per line, minimum 3/-.

Advertisers under the heading will only be accepted from members of Hamadars who desire to dispose of equipment which is their personal property. Copy must be received by 8th of the month, and remittance must accompany advertisement. Calculation of cost is based on an average of six words a line. Call signs are now permitted in Hamads. Advertisers' advertisements not accepted in this column.

FOR SALE: AR88D Receiver, rack mounting, less speaker, good condition, £90. MN26C Compass Receiver, as new, with remote control unit and Bowden cable, £15. VK3DY, 174 Johnson Street, Maffra, Vic.

FOR SALE: Com. Receiver AR88D in beautiful condition, original S meter and speaker, £115, or will accept best offer over £100. Write E. Parow (VK4EP), C.O. P.O., The Summit, Qld.

FOR SALE: New Geloso V.f.o. 4/102, £9. New Gorler Rx Turret, 500 Kc. to 30 Mc., 6 bands, £13. AT5 Tx with valves (very clean). MN26C Compass Rx, a.c. power supply, Eddy. dial. 25 watt Mod. Tran. Nearest offer on any or all. B. Alexander, VK3ADV, Box 19, Skipton, Vic. Phone 27.

FOR SALE: One 36 ft. Steel Tower, new, in three 12 ft. sections, can be obtained from 2 Wonga Grove, McCrae, Vic. Price £30. Tower is three-legged with hinged legs at the bottom.

SELL: Command Receiver, 6-9 Mc. modified to double conversion, 175 Kc. 2nd i.f. £7. Trimax Receiver Cabinet, grey enamel, takes chassis up to 18" x 10", £2. Genemotor, 18/450v, with 12v. starter relay, 30/- Pair 110 Kc. i.f. transformers and b.f.o. coil, 30/- Datto, 50 Kc., 30/- Pair OC16 Transistors, new, £3/10/0. VK3AEI, FU 1580.

SELL: Comm. Rcvrs. R.C.A. AR88D; Hallicrafters S-39; Cray, 1392A (100-150 Mc.); Converter RF27 (60-100 Mc. to 7 Mc.); Freq. Meter, Xtal check points to 30 Mc.; 11" C.R.T.; Transformers, 1kv/5mA.; 500s./80mA.; 320s./60mA.; 24V/7.5mA. with rect.; Chokes, National Velvet Vernier Dial; Meters; 100 issues "QST" to Dec. '59; Sundries. Rear Flat, 103 Buxton St., Nth. Adelaide, SA. Not Saturdays.

SELL: Eddystone 888, good condition. £200. V.h.f. Receiver, tunes 23 to 100 Mc., £70. Hilliard 57 Gardenia St., Blackburn, Vic. (WX 2498).

WANTED TO BUY: Comm. Receiver, Short Wave Bands, good quality job. 205 Elgar Road, Box Hill South, Vic. Phone: BW 2785.



THE MAN SAID REPLACE IT WITH A NEW *Super* RADIOTRON PICTURE TUBE

I'm a businessman, and while I wouldn't dare admit it to my wife, I know nothing about the workings of our TV set, even though we've had it almost four years. For that reason, when the picture tube needed replacing last week, I told the Serviceman that I wanted the best possible picture tube available in Australia. One that was not only reliable, but also backed by a firm that offered immediate replacement and round-the-clock expert service and testing. After mentioning these points along with a price that I would be happy to pay, the man said, "Replace it with a Super Radiotron Picture Tube."



AMALGAMATED WIRELESS

VALVE COMPANY

PROPRIETARY LIMITED

SYDNEY - MELBOURNE - BRISBANE

A New addition to our vast range of Amateur Equipment and Accessories

THE K.W. 'VICEROY'



A New Single Sideband Transmitter

This superb S.S.B. Transmitter features:—

- 180 watts of P.E.P. power.
- Unwanted sideband suppression 40 db. down at 2 Kc. or better.
- Carrier suppression 45 db. down or better.
- Five bands, 10-80 metres, Pi output.
- T.V.I. precautions taken.
- All crystals included.
- Automatic level control.
- Rugged construction.
- Full voice control and anti-trip system.

The S.S.B. Generator:

The exciter section of this S.S.B. transmitter employs a crystal filter based upon the G2NH design. A 12AU7 is used as a 435 Ke. crystal oscillator and phase splitter to drive the balanced modulator at low impedance. The balanced modulator consists of a matched pair of crystal diodes into which audio is fed at low impedance. The modulated signal is then passed through a half lattice filter which rejects the unwanted sideband and provides a passband flat within 3 db. between 250 and 2,800 c.p.s. Four crystals, vacuum mounted in B7G valve envelopes, are employed (two in the half lattice filter, one carrier oscillator and one series rejecotor at carrier frequency). The lower sideband generated is amplified and fed to the grids of a second balanced modulator (or 1st mixer). The output of the V.F.O. is balanced out in the anode circuit of this balanced modulator. The resultant 80 metre output is available for amplification and, being lower sideband, is suitable for operation on this band.

For operation on bands other than 80 metres, a crystal oscillator/frequency multiplier is switched in automatically by means of a wave-change switch. The output of the oscillator is fed into the 2nd mixer. By selecting suitable mixer crystals, upper sideband output is obtained.

Order Now! Shipment Arriving Shortly!

Kindly address all enquires direct to:

Sole Australian Factory Representatives:

Cable: "Cunnig"

R. H. CUNNINGHAM PTY. LTD.

VIC.: 8 BROMHAM PLACE, RICHMOND, 42-1614

N.S.W.: 16 ANGAS ST., MEADOWBANK, 80-0316
Q.L.D.: 43 BOWEN STREET, BRISBANE, 2-3755

S.A.: 14 STAMFORD COURT, ADELAIDE, 51-6392
W.A.: 10 MELVILLE PDE., STH. PERTH, 67-3836